JANUARY, 1943

Industrial FINISHING

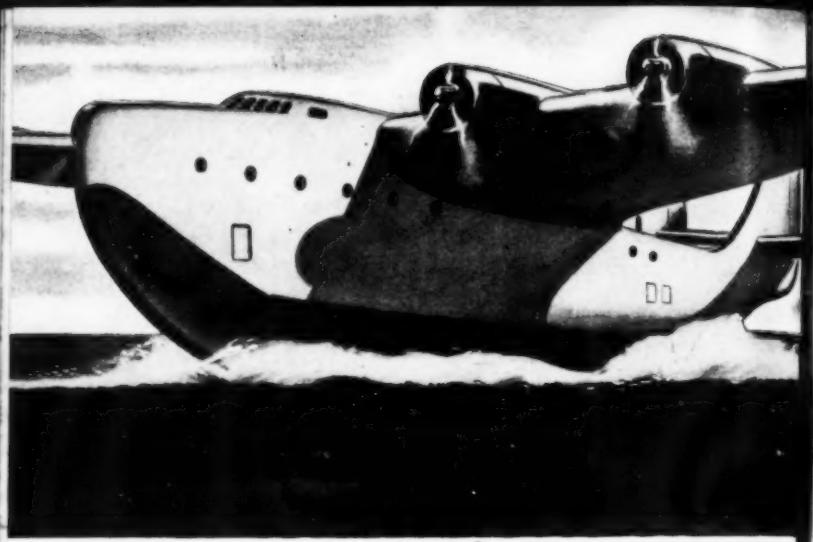
Published Monthly in the Interest of Modern Production Finishing

PUBLIC LIBRARY
JAN 23 1943
DETROIT

What a TRANSITION!

In one year (1942) we have overcome the plotting, planning and more-than-eight-year production start on the part of the Axis. This year (1943) we will outproduce THE WORLD in guns, bullets, bombs, shells, planes, tanks and ships. . . All of which shows what can be accomplished by men and women who cherish the American ideals of liberty and free enterprise.

LILLY VARNISH COMPANY
Indianapolis, Indiana
Branches: Chicago, Ill.; Grand Rapids, Mich.; Gardner, Mass.
THE LILLY COMPANY, High Point, North Carolina



Crusader *Plywood Finishes*

PROVIDE BETTER MOISTURE RESISTANCE

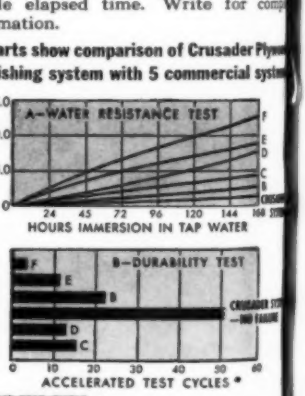
AN efficient plywood finishing system will retard moisture penetration sufficiently to prevent excessive weight increase, which results in loss of plywood strength.

Crusader plywood finishes are specifically engineered to retain this prime function under the influence of sunlight, high and low temperatures, high humidity and abrasion. Note the relatively minor differences in weight increase through water immersion in the systems shown on chart "A" as compared with the wide variation in durability of the same systems as shown on chart "B".

Furthermore, "Crusader" plywood finishes are highly resistant to aromatic aviation fuel, de-icing fluid, brake fluid and lubricating oils. Their smoothness and non-specular properties exceed exacting military requirements.

They require, in production, a minim number of operations, and the shortest p ticable elapsed time. Write for comp information.

Charts show comparison of Crusader Plyw finishing system with 5 commercial syst

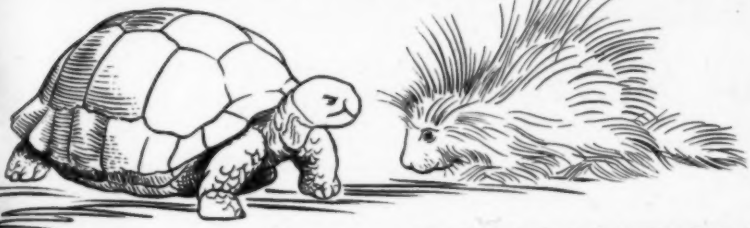


ROXALIN *Flexible* FINISHES
INCORPORATED
ELIZABETH • NEW JERSEY

Box 113

WATCH ROXALIN IN AVIATION

The Right PROTECTIVE COATING



is a product of EVOLUTION

Some of the many war products finished with Murphy Protective Coatings

Airplanes
Commando Ramps
Communication Sets
Gas Masks
Gliders
Optical Apparatus
Plywood Assemblies
Range-finders
Ration Cans
Searchlights
High-precision Instruments
Ship Fittings
X-Ray Equipment
Shells
Trucks
Machine Tools
Dental Equipment
First Aid Boxes
Propellers
Gunstocks
Sterilizers
Health Lamps
Navy Lockers
Sound Detectors
Ammunition

Nature evolved the right protective coating for each of her creatures over a long period of time . . . The Murphy protective coatings designed for planes, microscopes, gunstocks, etc. are likewise products of evolution. For they represent more than 75 years of specializing in the development of finishes of *every* type for practically every important *product* requirement.

This Murphy experience in serving leading manufacturers has proved invaluable in meeting wartime finishing needs. And it accounts for the large and steadily increasing quantity of war material now being finished with Murphy coatings.

PUT IT UP TO MURPHY

and you will get the right protective coating for the type of product you are making for the armed forces. Moreover, it will be a coating perfectly adapted to your production methods — and that means *time* and *money* saved.

Consult our nearest office

MURPHY VARNISH COMPANY

NEWARK SAN FRANCISCO CHICAGO

IN THE AIR—
ALL OVER THE WORLD
ZAPON SX-35

Zapon's finishing system based on one material only up to the top coat, is now in use for plywood planes, gliders and wood propellers.

One important reason for the immediate success of this finishing system is Zapon SX-35. This product, originally designed to meet Government specifications for plywood plane sealer, has been found to exceed specification requirements and, with a minimum of material weight, provides highest moisture resistance. Hence it is the basis of Zapon's complete finishing system, eliminating the necessity of surfacers.

For close grain woods three coats of SX-35 followed by an aluminum coat or camouflage enamel constitute a complete system.

For open grain woods the finishing system includes a first coat of SX-35 followed by a filler coat, the base of which is the same product, and finally followed by two coats of SX-35 and the top coat.

Recognition of its simplicity, durability, moisture resistance, and speed of application has led to the adoption of this finish by a constantly increasing number of plywood plane builders. It will certainly help you.

A comprehensive booklet kept up to date by new data sheets will be sent on request.

ZAPON

ZAPON DIVISION · ATLAS POWDER COMPAN

Eastern Sales: Stamford, Conn. Western Sales: North Chicago,

INDUSTRIAL FINISHES

"Wartime Painting Achievements" Page 54

Industrial FINISHING

Reg. U. S. Pat. Office

Published Monthly in the Interest of Modern Production Finishing

Vol. XIX, No. 3 JANUARY, 1943 $2.00 a Year

Contents of This Issue

Letters from Readers of Industrial Finishing 4
The Present Status of Finishing Materials 10
A Review and Forecast of the Industrial Finishing Industry 14
Wartime Foremanship and How I am Making Out With It 18
Paints for the Gods of War 24
A Forecast on Finishes 39
Important Highlights in Wartime Painting Achievements 49
Wartime Painting Achievements 54
War-Changed Finishes 94
New Materials, Supplies, Equipment 98
Questions; Answers 100
New Books, Catalogs, Circulars, News Releases 106
Editorial 108
"Classified Advertising" Section 119
Advertisers' Index 120

Magnesium Cleaning 18
What "Enamel" Is 23
Hilo Trimmed for War Work 38
American-Marietta Co. Buys Ferbert-Schorndorfer Co. 46
Watch Your Motors 50
Masonite Replaces Steel 52
Color Goes to War 96
Glidden Co. 25 Years Old 96
Substitute for Toluol 105
Fire-Extinguishing System 105
Color in War Factories 112
What Japan Is 113
Care of Spray Guns 114
New Pacific Office Opened by Detroit Rex 116
Cleaning Iron and Steel Surfaces 117
New Masking Material 119

Owned and Published by

Practical Publications, Inc., 1142 North Meridian Street, Indianapolis, Ind.

Eastern Representative: C. A. Larson, 254 West 31st Street, New York City; Phone Penna. 6-9049

Letters from Readers...

OF INDUSTRIAL FINISHING

These letters (and many others) were answered recently by the editorial department, but are published here to reveal certain interesting trends of desire and activity in the industry, and to encourage additional inquiries, comments and suggestions. Further information about any of them can be obtained by writing this office.—Editor.

Oven Dip Tanks

We would like to know the names and addresses of J. M. Co. (page 7, Dec. issue) and H. C. (page 8, same number), the first one inquiring about baking ovens and the second about "Giant Dip Tanks."—Infra-Red Engineers & Designers.

Information supplied.—ED.

Important Corrections on "Streamlined Cleaning" Article

In reading the article I wrote on "Streamlined Cleaning of Metal Surfaces in War Production," as published in December 1942 issue, I find that you forgot to correct one mistake which I called your attention to, which is right in the beginning of the article (page 31, top of second column); that is where it says 6-oz., it should have been 4-oz.

You also forgot to number each example formula consecutively as I asked you to do.

But the gravest mistake, one that makes me look like a big fool, is on page 38 in the second column, where you have "Brass and Copper Cleaners." I never designated these formulas as such. Please look up my copy. How this can be corrected I do not know, but everyone who reads this and who knows anything about alkali cleaners, will say: "That guy is nuts."

I believe the only way this can be corrected is to send a personal letter to each subscriber. Even that would not get all who read it, as there is always more than one in each plant.—CLAUDIUS NIELSEN.

Sorry about the errors, Mr. Nielsen. Your original copy gave the amount as 6-oz. and, in the hurry of getting out December issue and planning the January "Wartime Painting Achievements" number, we overlooked making the correction you wrote about in a later letter.

Regarding the mistake on page 38, second column, your original copy reads: "Example of Ferrous Metal, Brass and Copper Cleaners," which agrees with the paragraph following the formulas. Through some error, "Examples of Ferrous Metals" was omitted. We ask all readers to make these important corrections in December 1942 issue of I. F.—ED.

Zinc-Coated Nails Not Harmful

Our attention has been directed to one of the "Letters From Readers," on page 4 of your November 1942 issue, reading as follows:

For Coating Nails

"Carpenters in this vicinity (Vancouver, B. C., Canada) have lately been complaining that galvanized nails have made them sick, particularly when nails are held in the mouth by shingelers. We understand that some manufacturers in the United States are using a plastic coating after the galvanized treatment to prevent oxidation of the zinc which might come

DOLAN WAR FINISHES

for WOOD and METAL

Olive Drabs ★ **Rot Inhibiting Primers**
Lustreless Enamels ★ **Battleship Grays**
Shell Lacquers ★ **Airplane Dopes**

If you are figuring on Government contracts with the Army, Navy, Air Corps or any branch of service—we are equipped to furnish the finishes according to Government specifications. Our staff of Laboratory Technicians is familiar with all problems and its services are available for the asking.

Also Still Available

DU-BAR BLEACH ★ **FABRI-CLEAN**
For modern light-tones **The magic Fabric Cleaner**

V. J. DOLAN & COMPANY, INC.
Mfrs. of "Unquestionable Quality" Industrial Finishes
1830 N. LARAMIE AVENUE CHICAGO, ILLINOIS

HOW *SOON* DO YOU NEED AN *OVEN?*

GKS CAN DELIVER

standardized ovens or specially designed systems for handling any kind of drying or baking job.

GKS dependable ovens and finishing systems are helping to speed up production in war plants all over America. They'll do the same for you.

PHONE, WIRE OR WRITE US ABOUT YOUR REQUIREMENTS . . . . TODAY!

GEORGE KOCH SONS, INC. Evansville, Ind.

SPECIFICATION PROTECTIVE COATINGS

UNITED'S Specification Protective Coatings are doing their part to help keep war production schedules rolling.

There is a specially formulated United product to meet the rigid requirements of any Government specification protective coating. Years of constant research and product development have enabled us to meet the unusual requirements and demands of war work.

Call on United for Government Specification Coatings and let us help you solve your finishing production problems and "Keep 'Em Rolling."

UNITED'S S. P. COATINGS ARE NOW USED ON SHELLS, AMMUNITION BOXES, AMMUNITION, ARMY TRUCKS, SIGNAL CORPS EQUIPMENT, INSTRUMENTS AND PANELS, AIRPLANE PARTS, PORTABLE MACHINE SHOPS, ETC.

LACQUERS
THINNERS
ENAMELS
METALIZED FINISHES
SYNTHETICS

UNITED LACQUER MFG. CORP.
General Offices and Factory: Linden, New Jersey
New England Mfg. Division: Boston, Mass.

Speeds production for coating WAR PRODUCTS

500 Large Cartridge Clips Coated Per Minute
1000 1" Buckles Coated Per Minute with R-200

"SPEEDIP" Whirl Enameler and Coating Machine

A combination dipping-whirling machine for completely coating large quantities of small parts with lacquer, enamel, paint, oil, wax, etc. • All operations are within the machine. Parts are dipped into coating material, raised and whirled. Time—as little as 30 seconds. Speeds up production—cuts finishing costs—saves up to 90% of coating materials.

WRITE FOR FURTHER DETAILS OR SEND SAMPLES TO BE COATED.

RONCI MACHINE CO.
45 River Ave., Providence, R. I.

off in the mouth of the shinglers. We would appreciate your advising us at your earliest convenience if you are able to supply or recommend a plastic coating to solve our problem—D. Rustproofing Co., Ltd."

We are writing you because of the implication in the first sentence of this quotation that galvanized nails have a toxic effect on workers who put them into their mouths.

For your information, we wish to state that it has been our custom to refer any questions concerning the possible toxicity of zinc to Dr. C. K. Drinker, Dean and Professor of Physiology, Harvard University, School of Public Health, 55 Shattuck St., Boston, Mass.

In 1937 a manufacturer of shingle nails, which are zinc-coated by the dipping process and which it is common practice for carpenters to "mouth," asked Dr. Drinker whether or not his experience with zinc would lead him to believe that clean metallic zinc might react with saliva to form a compound which would be injurious to mouth tissue. Dr. Drinker replied to this manufacturer as follows:

"This particular difficulty that you mention in your letter of May 15 crops up every now and then. There is nothing about zinc and the reaction of zinc with the saliva which is worthy of attention on your part. The fact that the zinc coating is apt to roughen the nails slightly is, in my opinion, the principal cause of the trouble. Certainly it would be a waste of time and money to attempt any sterilization, etc., since owing to the slight antiseptic action of zinc it is extremely improbable that pathogenic organisms could grow on such a surface."

We are sure that you do not wish the readers of INDUSTRIAL FINISHING to be misled, and that you are interested in having the facts before you. We shall be much obliged if you can take steps to correct any misunderstanding on the part of your readers at the publication of this statement. We are also sending you this letter in duplicate in order that you can send a copy to the reader, the D. Rustproofing Co., Ltd.—American Zinc Institute, Inc., 60 E. 42d St., New York, N. Y.

Fire-Resisting Paint

In the November issue of your magazine, page 4, I read that W. Co. is interested in receiving information on fire-resisting paint.

About two years ago I had occasion to see a demonstration of a blow torch, which was primed to 200-lbs. pressure and 4000° F., and held only 2-in. away from a piece of wood veneer which had been sprayed with a paint that was fire-resisting. The only effect it had on the piece of veneer was to scorch it. The same test was applied to a piece of fabric which had been sprayed with this same fire-resisting paint, and the result was the same as with the wood veneers.

This paint can be applied either by spraying or dipping and requires two or three coats, each one of which dries in about one half to one hour. Its fire-resisting quality appears to be most advantageous when applied to a fabric or wood veneer, as the paint becomes fused or impregnated into the fibers of the article, rather than just serving as another layer of paint. When dry, the finish is as smooth as glass, and neither the fabric nor the veneer lose their flexibility.

I have a small amount of this paint, but have no information as to the formula used in making it. Is there any suggestion that you would like to make, whereby this paint could be placed in the proper channels for analysis? I am thoroughly convinced of its possibilities. — Innovation Air Brush Co.

Dura Seal Filler

We are looking for a product known as "Dura Seal," which is a wood filler finish and we would like to know the manufacturer's name and address at once.—H. Fixture & Supply Co.

In the 1941 Trade Mark Directory of the National Paint, Varnish and Lacquer Assn., Inc., we find three products named Dura Seal, but question whether any of them is what you have in mind. Perhaps some reader can give us this information.—ED.

Cotton Buffs

We would appreciate your advising us if you have available any literature or books on the subject of cotton buffs for polishing metal finishes. Any information you may have on the subject will be appreciated.—R. D. C. (Mfrs. of Everything of Canvas).

Black Stain Formula

I will be glad to supply the penetrating black stain formula, which involves the use of aniline hydrochloride, which is asked for on pages 7 and 8 of November issue of INDUSTRIAL FINISHING, upon receipt of the name and address of inquirer.—Ray C. Heydrick, Foreman, Structural Div., Michigan State College, East Lansing, Mich.

Old editions of the "Chemical Rubber Handbook" contain the formula for a stain, as described by R. W. A. on pages 7 and 8 of your November issue. The same handbook has other

formulas in recent editions (25-p 2386). This book may be obtained from the Chemical Rubber Publishing Co., Cleveland, Ohio.

Some time ago the use of potassium permanganate and sodium bisulfite for cleaning hands was mentioned in your magazine. We found a long time ago that stock solutions of these reagents were more effective and less wasteful than the crystals.—R. N. D. (Chief Chemist).

Tack Rags

In your November issue we noticed mention of a tack rag. Will you kindly advise us the names of one or two manufacturers of these rags?—D. K. G. Co. (Glass Specialties).

Detearing Process

In the September issue of INDUSTRIAL FINISHING, there appeared an article under the name of "Detearing Process." You state that an illustrated description of the equipment mentioned in this article is available. Will you please send a copy of this, to the attention of the writer?—N. S. J. (Pacific Coast Aircraft Division).

Request granted.—ED.

"Dry Stickers"

There is an article in your November 1942 issue, by L. Fantow, regarding a type of sticker with adhesive backing that can be applied without moistening and can be peeled off without leaving any trace on the surface. We should like to get in touch with this manufacturer and get a sample, if possible.—F. & H. (True Temper Products).

It is Avery Adhesives, 451 E. Third St., Los Angeles, Calif.—ED.

Chipped Enamel Repair

Some time within the past year, I have seen in your magazine, INDUSTRIAL FINISHING, an article on the subject of repairing chipped enameled finishes. In a recent move from Buffalo to Newark, the white enameled surface of the ornamental riser piece at the back of my stove was badly chipped. War conditions prevent the manufacturer from furnishing a replacement piece, and neither the moving company nor I have been able to locate anyone in this area who can refinish the surface, which is not subject to direct heat. Can you suggest any repair product now on the market which might be used to improve the appearance of the damaged part of the stove?—M. G. T. (Cable Corp.)

Information supplied.—ED.

Wood Flour

I just saw H.R.'s request on pages 8, 99 and 100, of November issue, wherein he asked for the name of a manufacturer of wood flour. This can be secured from the American Cyanimid and Chemical Corp., 30 Rockefeller Plaza, New York, N. Y. They can furnish all grades used as fillers in plastic molding.—C. O. S.

Striping Tool

Will you please tell us if you know any manufacturers who make tools for striping lawnmower blades? We will appreciate any information you can give us on this.—B. Mfg. Co.

We believe that one of the several striping tools previously publicized in this magazine will serve your purpose, and we are sending you names and addresses of the manufacturers.—ED.

Spray Inside Tubes

We have a customer who is confronted with the problem of spraying the inside of iron tubes 8-ft. to 12-ft. long, 7-in. in diameter. We notice that this problem is dealt with in the article, "Spraying Inside Shells, Tubes and Containers," by George Montgomery, November issue. We will appreciate it if you will write us a source of supply for the proper spray equipment for doing this job.—N. Co. (Paint Products). P. S. This equipment is required on a War Project bearing a high rating.

Information supplied.—ED.

Coated Fiber-Board

You mentioned in a recent issue that one of your readers is interested in locating a source of supply for approximately .050 fiber-board with pyroxylin coating. We may be able to take care of this requirement, inasmuch as we manufacture fiber-board in this thickness and also we have coating facilities.

Can you give us more definite information in regard to the specifications, both on the board and on the finish? Also advise whether a priority rating

(Continued on page 111)

FOR WAR

...or Civilian Necessities

★ **LACQUERS** ... For every wood and metal finish.

★ **FILLERS** ... Originators and sole owners of the patent on fast-drying wood filler.

★ **STAINS** ... All types—shading, toning, penetrating, blending, and perma stains—for every use.

★ **ENAMELS** ... Industrial or maintenance.

★ **PAINTS** ... Industrial, upkeep. Also for machinery and equipment.

Immediate Service!

STILLE-YOUNG CORPORATION

MANUFACTURERS · CHICAGO

QUERS · FILLERS · STAINS · ENAMELS · PAINTS

The Present Status of

BY S. P. WILSON, Ph. D.

OUR FIRST year of actual participation in the war has passed, and with its passing much of the conjecture in regard to restrictions on the manufacture and use of finishing materials has become translated into definite, if not always palatable, realities.

The outstanding change brought to our industry in 1942 was the gradual replacement of priority requirements for scarce materials (and almost everything we use is scarce) by the more recent allocation regulations. Formerly an order with a reasonably high priority rating was usually adequate to secure the necessary ingredients for filling it, but now, under allocation, it is necessary to apply in the month before receiving the material; and the criterion for granting the application in Washington is not necessarily the priority rating but, more importantly, the exact end use of the final product. When this is considered, it often happens that AA1 priority requests are rejected if, in the opinion of WPB, the requirements can be met with less critical materials. Even the armed services have their specifications thoroughly scanned and revised if scarcity requires the reduction or elimination of ingredients that have become too difficult to obtain.

Small Choice Left for Non-War Industries

Among the materials recently placed on allocation are some of the most fundamental in the industry. Butanol, phthalate plasticisers, nitrocellulose (both virgin and film scrap), castor oil and derivatives, phenolic resins, aromatic solvents of all types and many minor items. These materials make up a list that practically blankets the modern paint, varnish and lacquer industry.

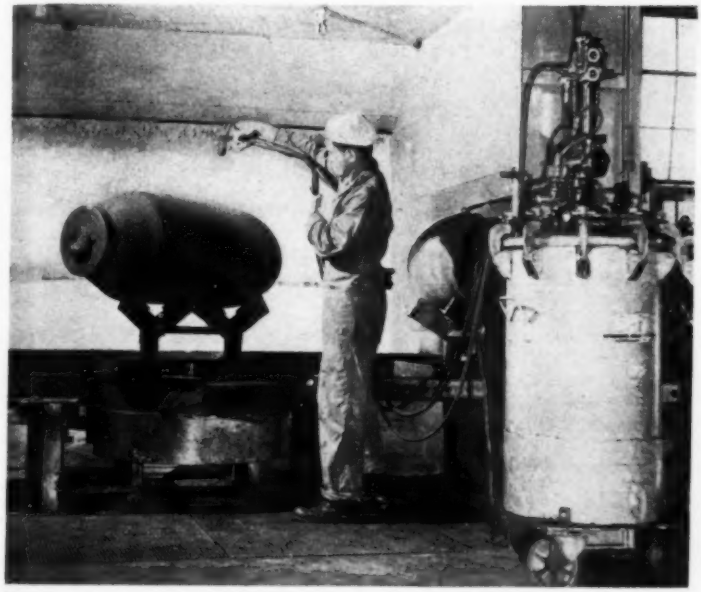
Some items, such as chlorinated rubber and vinylite-type resins have been practically forbidden for coatings, no matter how high the priority. They are reserved for a certain limited number of war uses where they fill a specific, intrinsic and irreplaceable need.

In addition, all vegetable and marine oils have been curtailed for the industry by a sizeable percentage, so even the basic linseed and fish oil substitute finishes cannot be manufactured in unlimited quantities to replace the more desirable materials removed from the market by present restrictions.

Problem for Manufacturers of Non-Metallic Goods

Since the manufacture of metallic articles, for anything other than war or very essential civilian use, has practically ceased, the industries most affected by these regulations are those employing non-metallic surfaces, such as the furniture, toy and novelty manufacturers. Even if they can overcome the wood, hardware and labor shortages, it would seem that they must look for finishes that contain

Finishing Materials



Spray-painting 1000-lb. bombs in water-wash spray booth. Photo courtesy DeVilbiss Co.

no nitrocellulose, no shellac; no tung, perilla or dehydrated castor oil; no phenolic resins nor (after January 1943) any phthalate-type alkyd resins.

The hope for these industries is in the newly developed conugated-linkage type of linseed oil that has drying properties comparable to dehydrated castor or tung oil; and in modified rosin derivatives for resins, plus the indomitable determination of the finish manufacturers to develop something suitable for their good customers.

It is scarcely to be hoped that these emergency finishes will, in all cases, equal the highly developed technical achievements that they replace, but the users of finishes and their customers will undoubtedly make the necessary allowances for the urgencies of this major struggle in evaluating them.

Materials Which Have Become More Plentiful

Some materials have become more available through the peculiar interplay of causes and effects that the war has brought about. Titanium pigments, very scarce a year ago, are now quite easy to obtain. Most zinc and lead pig-

ments are likewise more available. The anticipated shortage of chrome pigments has been greatly relieved through curtailments caused by war and larger production from domestic ores, and is now considered of small moment. What the 1943 production of ships and planes, with their huge demands for chromate-type primers, will do to this remains to be seen.

While requests for shellac are scanned with great severity, several substitutes based on alcohol-soluble proteins and rosin derivatives are announced, and will undoubtedly fill a great need. Congo copal resin seems to be still coming in and is the basic available natural resin. Alkyd-type resins, using maleic and fumaric acids instead of phthalic, have been announced and will undoubtedly become an important factor in 1943 when allocation of phthalate type resins removes them for some uses.

Protection, Identification, Concealment of Products of War

The foregoing survey was made primarily from the standpoint of those concerned with non-war production. Some of the peaceful amenities of life will go on, even in the midst of total war, and the adaptabiltiy of the American industrialist in using available wood, glass, ceramics, paper and a limited variety of plastics to make permissible articles should be supported by the finish manufacturer with equal ingenuity.

However, 1943's production will overwhelmingly be for the war and by far the greatest percentage of our industrial finish output will be devoted to the protection, identification or concealment of the weapons of war and their auxiliary requirements. Here the problem of availability is not so much of a concern, as specifications are or will be designed to use available materials. The chief problem for both the makers of weapons and the makers of finishes, therefore, is to be able to adjust themselves to the changing pattern of war requirements. Since the rough outline has been well publicized in the daily and technical press, it should not be amiss to survey this prospect.

Moving the War to Enemy Calls for Ships and Planes

The North African campaign signalized the opening of an offensive period, as contrasted to the previous holding or defensive status. This means a curtailment of defensive weapons such as heavy anti-aircraft guns and their ammunition; a possible reduction in barracks-building as troops move out more rapidly to the firing line and make room for replacements; a curtailment of building of manufacturing facilities, and many other projects that the reader can easily visualize.

On the other hand, the program for 1943 calls for vastly increased ship and plane construction, with the necessary weapons for moving the war to the enemy. One can thus forecast a reduction in finishes for camps and barracks, for trucks, jeeps and possibly tanks; for some sizes of shells and cartridges and the guns to fire them, while the labor and metal freed thereby will go into more ships to carry the men and material, more planes to drop more bombs, light artillery rather than heavy, until we have a balanced production where no excess equipment will be piling up while needed materials are thus diverted from other fields where shortages may be occurring.

Therefore, finish manufacturers now busy on war orders may have

to adjust themselves rapidly to new specifications and requirements, as the needs of the armed services shift with the fortunes of war.

When and If War Production Gets a Balanced Basis

It might conceivably happen, once the ultimate consumption of material in active battle can be accurately gauged, that some percentage of steel, brass, etc., could be allotted to civilian industry to meet fragmentarily the demand for home equipment now pent-up by absolute freezing — but this can hardly happen in 1943 when it would appear that every bit of productivity possible will be needed to build up a weight of equipment so great that battles and final victory can be assured with minimum losses.

Should the war drag on, however, a point of productivity is conceivable where a surplus could develop for manufacture of civilian goods for ourselves and for our allies in both hemispheres. In this event it is possible that suitable finishes could also be allotted to the makers, and an opportunity would open for paint, varnish and lacquer manufacturers to start production of finishes again in a small way for the future.

Yes, You Will Have Problems in 1943, Too

Nineteen forty-three will be a very difficult year for everyone. Finishing foremen will have to contend with labor problems, equipment problems and material problems, among which unfortunately will appear some finish vexations. Besides the materials discussed here, a great difficulty — and one which will grow increasingly serious—is that of containers.

Steel drums, kits and cans are rapidly being eliminated for many finishing materials and the substitution of glass, fiber and wood is going to bring a new series of headaches to all concerned. We can only suggest that all possible care be taken of present containers and that the technique of handling the new ones be acquired as rapidly as possible.

Finally, let us all keep in mind that the war comes first and that any hardships now encountered are vanishingly small when measured by what our armed services must undergo in the trials to come and by the consequences not only of defeat, but of a prolonged and exhausting duration of hostilities. All available conservation of material and labor, all ingenious shortcuts and uncomplaining adjustment to the necessary difficulties, which we must make, should be given in the hope that it will help win the war in the shortest possible time.

Magnesium Cleaning

PREVIOUSLY we used chlorinated solvents for cleaning magnesium, but recently we substituted an alkali solution. Vapor degreasers were excellent for removing oils, but where polishing rouge and China-wood oil resins had been used in previous operations, the degreasers were not so satisfactory. We found that by using a high-alkaline immersion dip (solution approximately 10-oz. to the gallon) with the parts left in for about two minutes and following with a warm water rinse, we obtained results far superior to and more economical than we could get from our degreaser. Also, a more uniform dichromate treatment is received, which results in better protection. —F. I. M.

A Review and Forecast

OF THE INDUSTRIAL FINISHING INDUSTRY

BY CHARLES A. LANKAU

A REVIEW of the past year in the organic finishing field reflects the trend of business in general, converting from luxurious peaceful industry to a world at war with certain specific transformations. We saw the nation take cognizance of a serious international crisis and tighten its belt as it began the defense program in 1940. Raw materials began to become scarce and there was a clamor to increase inventories of raw materials and finished products in order to avoid being "caught short."

By the end of 1940 and in the beginning of 1941 raw materials were becoming more difficult to obtain. In order to insure an adequate supply for the defense program, O. P. M. was instituted. The beginning of priorities for 1) defense industries, 2) essential civilian, and 3) non-essential and luxury industries allocated the available raw materials in order of their importance to the defense effort. And, finally, the flame that touched off the incendiary of American will and determination—the attack on Pearl Harbor—changed the entire picture of industry from one of defense to a total all-out war effort.

In the early part of 1942 there were shortages of certain pigments such as titanium, zinc and chromium pigments, phthalates, phosphates (of interest in the finishing industry as plasticizers), China wood oil, formaldehyde and its compounds limiting certain resins, phenol and creosol (basic ingredients in other resins), nitrocellulose, elimination of all rubber derivatives, and practically all vinyl compounds. The effect of these shortages on the finishing industry were numerous.

Substitutions were made, using the best available materials at the moment. Substitutes for these were made as new shortages existed and new demands were made by the military forces. Industry quickly learned to accept the offerings and recommendations of the suppliers. The finishing industry's engineers were forced to abandon the practice of time-proved tests and rely on experience and ingenuity to develop momentarily materials of new or substitute materials, of inferior grades, of modified ingredients for old uses, new uses, old and substitute surfaces.

In the face of all this the requirements of the armed forces for materials of war as ammunition finishes, bomb finishes and coatings for sundry parts and articles of ordnance, etc., were increasing and changing. Formula specifications were eliminated and performance specifications written to allow the

suppliers wider latitude of formulation and possible substitution when certain raw materials became too critical for the purpose at hand.

Period of Transformation . . . To All-Out War Effort

During the period of transformation from defense production to all-out war production, a sudden cessation of requirements for the automotive, refrigerator, washing-machine industries, etc., reduced the demand for certain types of finishes such as urea-formaldehyde and melamine formaldehyde. Until the requirements of the war industries could expand to absorb this sudden over-abundance, these materials were suddenly available for many less important uses, including essential civilian. As the war requirements expanded, other uses for the raw materials for these resins developed, shipping facilities became more acute and manpower was diverted, these materials again became more restricted until they are now limited to very few uses and will soon be allocated only for implements of war.

We have seen the orderly passing of the O.P.M. and the institution of the W.P.B. As experience in the war effort developed, there was the system of priorities; then direct allocations and Production Requirements Plan, which is now on the way out to make way for a more efficient plan. The effect of these changes on the finishing industry has been a constant tightening of supplies, necessity of anticipating future requirements and placing of orders for future delivery to allow for proper authorization and granting of allocations. It has practically made such materials as toluol and chlorinated rubber extinct for the duration. The results of these changes have been discussed before and are recalled here to point out some of the reasons for substitutions.

Imported Materials Out; Orders of Limitation

At the beginning of 1942 it was possible to formulate with what stocks were accumulated during previous year. These have long since been used up and inventories in general have been reduced to a bare minimum for practical operation. New supplies on more and more items are being granted only on the most important items, when supported by sufficiently important end uses. The imported goods such as shellac, dammar, Manila, elemi, batu gum, etc., used widely in organic finishes of many types, have ceased coming in and the nation is conserving a diminishing supply. Consequently, it is necessary to use them where they will most benefit the war effort.

As a result there have been established the long list of orders of limitations. To name a few, there are the 1) Pencil Order revised and amended, 2) the Machine Tool Order, 3) Aromatic Petroleum Hydrocarbon Order, 4) Toy Order, 5) Oils and Fats Order, 6) Container Order, etc. These are all designed to limit not only the materials which may be used in formulation but also the number of coats or operations that may be used or performed with those materials which are allowed, as well as to limit the type or size container that may be used to package the finished goods. These orders not only conserve goods but speed up production, even though the quality of the finish may suffer.

The recently issued Caster-Oil Order, which undoubtedly will be amended, prohibits the use of this

material in all its forms in any finishing materials except a certain few specified uses, in order to conserve the supply for lubricating purposes for motors in military equipment. This order prohibits the use without qualification so that the oil may not even be used in Government Specification Finishes, necessitating substitution even in these important goods.

Blown oils, which have no value as lubricants are included in the order. From this it may be seen that a Government Contract does not insure delivery of the standard grades and that substitutes may be necessary. It is also indicative of the trend of limitations, so that organic finishes will be available as they are now known for only the objects of utmost importance.

Solvents Less Available

During 1942 solvents became less available for many reasons. Such materials as alcohol and toluol are used in large quantities in military requirements; the former in the manufacture of smokeless powder and the latter as the essential ingredient in T.N.T. The derivatives of the former, such as esters, alcohol ethers, etc., are consequently likewise limited.

Other solvents, such as aromatic petroleum hydrocarbons, have become limited because of the large demand caused by the elimination of toluol from the field of available solvents, and also because the process of manufacturing these has been changed to yield larger percentages of toluol, etc. Still others are limited because of shipping facilities and manpower shortage. Butyl alcohol, butyl acetate, glycerine and toloul are being drastically curtailed in allocation due to present demands far exceeding the output.

Important Resins Limited

Resins continue to be limited in general. Phenolics and their derivatives are now limited in their use to finishes only for application on "instruments of war." These exclude many uses for Army, Navy, Maritime, and Lend-Lease, which are not directly used on instruments of war and necessitate substitutes in such cases. The alkyd resins, products of phthalic anhydride and glycerin essentially, have not yet been put on as rigid a control, but it may be looked for in the not too distance future. These resins are considered of the most important synthetics for use in lacquer and synthetic coatings and their strict regulation will affect the coatings industry.

The resins which have largely replaced the natural resins also use glycerin in their manufacture but have been accorded a larger proportional percentage, for the present, in order to further conserve the supply of natural resins, such as shellac, dammar, etc.

Forecast of Future Sacrifices; Substitutes

A forecast for the future of the industry is, of course, problematical and controversial, but certain facts seem inevitable and are generally accepted as such. During 1943 it can be expected that the entire system of allocations, priorities, and method of administration will again be changed. Whether the new system will retain the name of W.P.B. or not is of no consequence, but it is without doubt that the experience gained in the past year of war administration will be utilized to best advantage, and together with the experience of business under the various systems a new and better one will be evolved.

Without doubt, until war production has reached its peak, more rigid control and smaller allocations will be made on a progressively increasing list of raw materials used by the finishing industry. The biggest problem in the immediate future will be containers and drying oils. During the present slack season these are being discussed by leaders of the industry in order to have a solution with the resumption of the next busy season.

This forecost is not encouraging. Many of the disputable developments have been omitted, but *our Government is bound to win this war at any cost and many sacrifices will be made.* Nevertheless, some very important developments have come about during the past year and many more may be looked for in the coming year. For example, some of the finishes developed recently were rarities in the peace before the war; others were unknown.

A lacquer type finish is now in standard use as a single spray coat system, giving sufficient protection to certain types of ammunition which will withstand rather severe tests, including salt spray. A dead flat-lacquer type pigmented material is now being applied by centrifuge to certain small parts for military requirements. Admittedly, the appearance is of secondary importance but the important factor of satisfactory protection is accomplished.

New Finishes of Value; Paint for Civilian Use

The experience gained by the finishing industry in its present endeavor will be reflected in new finishes of greater value by the end of the war. Some of the substitutes have proved vastly superior and will be adopted as standard, even long after the war. New developments in substitutes will prove of even greater value. Superior finishes for substitute surfaces will revolutionize many industries in the peace that is to follow. The present conservation and salvage has taught industry much that will be of lasting benefit.

Finishes for civilian requirements will continue through the ingenuity of American research, with the very limited raw materials. The quantity will be limited to the minimum for civilian existence but there will be something, even though the quality may be lacking. Until the last solvent has been completely used in its entire production, which can occur only with a perfect balance of all products and by-products, there will be organic finishes of some kind for domestic needs.

The forecast for 1943 is: Greatly curtailed products for civilian use, rigidly controlled products for all essential requirements, and increasing use of the allocation or rationing system to the complete accomplishment of 100% war effort, and vast strides in the development of new and superior finishes from limited supplies.

Do you operate a large dip tank, with its attending troubles in controlling density of the contents, or perhaps some skinning over? Make a wooden cover to fit closely to the inside of the tank, floating or suspended, so it just touches the surface of the material. Make a lid for the material, not for the tank, and avoid that air space between the top surface of the material and the top edge of the tank.—W. T. Smith.

Wartime Foremanship

AND HOW I AM MAKING OUT WITH IT

BY RED SPARKS

A YEAR of painting wartime ordnance products! A year of hustle and push; of quick thinking and fast action; of solving problems; of improving and scheming. A year of meeting sudden demands and maintaining schedules and everything else that goes with a doubled, tripled or even a quadrupled production. That was 1942. It continues in 1943. And making such a statement is not idle talk either. Evidence of that kind of production is found everywhere in these good old United States, wherever workmen are gathered together in any kind of a shop or factory.

A year of working on war work has done things to the finishing department foreman. It has taxed his ability to keep ahead of the ever-growing responsibilties that he has to assume. He has been forced to bring into play qualities that ordinary peace-time work did not demand. In fact, when I think over the traits I am supposed to have in order to be a foreman, it seems almost incredible that all of them could be possessed by any one man. They are not either! But the more of them you do possess, the better foreman you are.

Right now there is ample opportunity for a foreman to prove himself by bringing into play all the ability he has, because he is engaged in the business of Wartime Painting Achievements.

Now "achievement" in the finishing game does not mean simply the application of some kind of paint

A finishing foreman on war production should be a super-man.

to the product to be finished. It means much more than that. An article could be successfully painted so that it would look first class, if thought were given only to the actual painting. It might take two or three days or even a week to paint it and that would be only a partial achievement. So we must couple production with our painting if we wish to arrive at anywhere near perfection in our wartime efforts at painting achievements.

A good many things have a direct bearing on your success as a finishing foreman, particularly now that you are harrassed by added duties which wartime tacks onto you. Many of these duties are just small ones like, to mention one, selling the idea of continuous purchase of bonds to your men. That's a new duty that takes some of your time. And add to this, other duties that take you away from your regular department procedure. Pretty soon you find that something has gone wrong because you were busy with one of these new duties.

Well, the new duties have to be handled along with the old ones, which perhaps become more difficult. And by old duties that become more difficult in wartime, you can include just about everything you do in your department. You will understand what I mean as you read on.

Managing Old and New Workers to Get Results

When war work began to supplant our regular line of work, several of the older workmen became worried, knowing that they would have to be switched over to finishing war material. Some of these men have been with me since the first World War—men 50 to 55 and 56 years old. All of them are piece workers, making good pay and still able to produce without any appreciable let-down. All of them can work like the devil on piece work. Among them was Sam Reed, a touchy, nervous type of man who imagined things at times.

Sam came into my office one evening just at quitting time.

"Busy, Red?" he asked, after making sure that no other workman was heading toward the office.

"Why no Sam," I said as I looked up from my work of planning for the next day, "at least not so busy but that I can talk to you. What's on your mind?" I continued, for I saw anxiety written all over his face.

"Well . . ." he began hesitatingly, "it's, it's about this war work. What are you going to do about us piece workers?"

It was a foolish question. Sam was intelligent enough to see what was about to take place. However, I permitted a good-natured smile to come over my face as I answered him.

"Of course, Sam, I'll have to put you on war work. You understand that don't you?"

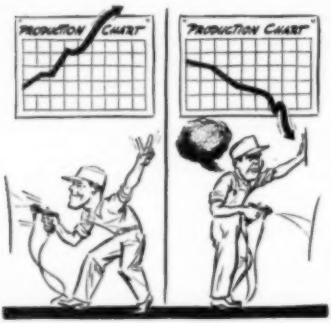
"Sure, I understand all right," he said, shooting the words out of his mouth in a way that showed he was all worked up. "We stop working on good piece-work stuff and go to work, day work, making war materials. 'Tain't fair. We can't make as much on this war work as we can on our regular work."

"Well now," I said, with a soothing voice, "maybe we can. We will see about it."

"Why don't you leave us regular men on piece work and make these new fellows you have hired do the war work?"

"And what will I do with you when priorities stop regular work, Sam?"

"Well, I hadn't thought of that,



Yes, it affects your production chart.

but anyway we don't want to work on war work. It's too hard for us old fellows."

"But you work hard on your piece work don't you?"

"Oh, that's different. We are used to that kind of work."

"Well, Sam, you just think this over. This war work has to be done and I think you old regular men are just the fellows to do a good job of it." With that I dismissed him. I watched him leave the office shaking his head in a way that told me he wasn't satisfied.

The Disgruntled Worker Who "Gets a Raw Deal"

Of course, I understood Sam. He had done his regular work so long that it was easy for him. War work, to him, was going to be a hard job. The worst of it was that he resented having to change and, to him, it wasn't a square deal. The seed of discontent had been planted in his mind and I knew that seed would grow and multiply and spread to the other regular men. Sam, though, is the worst kicker. He imagines that he gets all of the bad jobs and complains frequently. With it all though, he is a good worker and incidentally usually draws the biggest pay of all the piece workers. One day he came to me madder than all hell. His eyes fairly stuck out as he ground out his say so.

"I ain't gettin' a fair deal," he declared—his pet declaration.

"What's wrong now Sam?" I asked, striving to keep even tempered.

"You gave that piece work job to Pete. Don't seniority mean anything around here? I've been here longer than Pete has."

"Sam," I said rather sternly, "didn't you have some piece work a couple of days ago?"

"Well . . . . I guess I did boss, but you give him more piece work than you do me."

"Listen Sam, we are trying to win this war. Getting sore and complaining about inconsequential things like you do is just as bad as any other form of sabotage, because when you are disgruntled you cannot produce as you should. And when you are dissatisfied about something you communicate your feelings to other men working with you, and pretty soon all of you are in an ill humor and none of you is producing. Better go on back to work now and forget these things you complain about. Just keep in mind that you, too, are trying to do your part in this war effort and you won't have time to think about the other fellow."

Keep Your Workers Happy

In talking to Sam, I was trying to help keep him contented with what he was doing—contented from the standpoint that he would be happy in doing any war work that fell his lot to do.

It is part of achievement to keep workmen in a good frame of mind, because then they produce their best. And so, Mr. Finishing Foreman, if you are working in a war

production plant, you have just about the biggest job that you have ever had. You are in a pretty important place. The painting department is the last place along the line and nothing can be shipped until it passes through your department, but in your department many things can happen. It is the one place in the factory or shop where the men higher up are likely to take snap judgment.

Doing the Impossible to Meet Telegraphed Orders

It isn't so easy for an executive to go down through the plant on a tour of inspection that has been prompted by a telegram just received from the War Department urging immediate shipment on gun shields, for instance, and determine the shipping date, if he finds the shield plates in the shear department being sheared to size ready for heat treating. There are too many operations for those plates to go through before they become an assembled unit.

Of course, he can approximate the shipping date pretty close and he answers the telegram, stating that the first shipment of 50 gun shields will go forward on Thursday the 18th. That answer seems satisfactory and work progresses for four days when another telegram is received. "Must make shipment of 50 gun shields today." It is Monday the 15th. With the telegram in his hand the executive comes to the factory again. He enters the finishing room. Five of the gun shields have just arrived ready for painting. They are on the floor easy to see as a completed unit. All that is needed is to "squirt" a coat of paint on them, so he calls me.

"Red, we must ship 50 of these gun shields today." He looks me right in the eye, waiting for my reaction. He knows he has put me on the spot.

"M-m-m," I mumble and then stammer, "T-t-that's pretty quick, John. Besides, how you expect me to do that with only five of them here now?"

"Yes, I know you only have five now, but it is only eight o'clock and Steve promises to have the other 45 in to you by eleven o'clock. You can get them painted in plenty of time, Red." He then turned away from me, already on his way back to his office, satisfied that the gun shields would be shipped. Now that is what I mean by snap judgment or visualizing. John could easily visualize those shields being painted and shipped that day.

Well, I wouldn't let him down. I just considered that job a part of achievement, and went to work on it. Another thing; we had established a reputation in the finishing department and by all means it must be maintained.

Devising a Quicker Way to Handle Large Work

Those gun shields were heavy and awkward to handle. They had to be lifted with a portable crane and wheeled into the spray booth, and out again after spraying. A slow process, meaning about three to four units per hour which, of course, wouldn't get the job done, as we had only about five hours left in which to get the painting finished, leaving two hours for shipping. The proposition was a "head scratcher" but we did it.

Our first move was to discard the portable crane. Then we altered a 2-wheeled dolly that was used for other work, by welding a couple of prongs onto it. This permitted us to handle the gun shields by hand. The elimination of the crane, which took up a lot of space, made it

Being finishing foreman isn't always so rosy.

possible for us to place two shields in the booth for spraying at one time. This, together with the much quicker handling, by using the improvised dolly, raised the painting production to ten per hour.

Now what we used on this job was just some quick thinking in adapting the dolly to fit the job, and second, some quick action in putting the adapted tool to work. Of course, the altered dolly didn't work to perfection, but the idea of a new moving dolly had been born and now when we have gun shields to finish we have a dolly that handles them in fine shape. We called the master mechanic into the picture and had him make one that had all of the bugs ironed out of it.

Yes, sir, anything you do to facilitate the movement of war material through your finishing department is a Wartime Painting Achievement.

There are other things too that can be listed under the same heading. The achievement of maintaining a smooth running department which, in wartime, is much more difficult. The achievement of getting the work done in spite of the constant change in personnel. This one item alone is a big job. The war is taking most of the younger men and that forces the foreman to do his work with men who, under peace time conditions, he would not think of using.

How to Deal with the Lower Grade Workmen

Many of the men coming into the department as new workers at this time are men who perhaps are not adapted to the work to be done; but these men are the best that can be had. Some of them are less than average in intelligence. Not that their lack of learning is against them, for mostly these men are as willing as any man could be to do the work. We must have patience with these men because it is not their fault that they find themselves in jobs that are beyond their capacity. Then too, workmen, more than ever now, look to their foreman for guidance in personal matters. They will come to you with all kinds of questions—questions that require caution and tact in answering—and you must answer them or they lose confidence in you. And now to bring this article to a conclusion, there are a few rules that it might be well to mention:

1) Never make a promise to a workman that you cannot keep.

2) Never take advantage of a worker because you are the boss.

3) Never use your authority to excuse your own short-comings, at the expense of the workman.

4) Keep yourself cheerful, because if you get a grouch on it is easily and quickly imparted to the men.

5) Know your stuff yourself, and acquire the ability to impart your knowledge to others. To be a good teacher is an accomplishment that all foremen should have.

All of these things have a decided bearing on achievement, and as the boys in our armed forces need the material we are making, let it be said of those of us who are working in the finishing departments that our Wartime Painting Achievements are 100%.

What "Enamel" Is

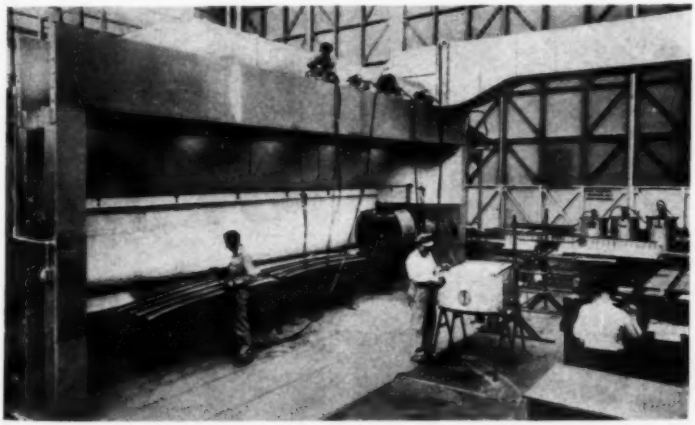
ENAMEL is a combination of pigment and a clear varnish or a clear lacquer. Thus we have "varnish enamel" and "lacquer enamel."

Varnish enamels are further divided according to the characteristics of the varnish. If it is made of synthetically produced resins, the enamel is known as a "synthetic resin enamel." If only natural resins are used, it is usually known only as "enamel."

If the enamel is quick drying, it may be known as "quick drying enamel" or "4-hour enamel." There are other such designations as "bath room enamel," "motor car enamel," etc. These may be made of either natural or synthetic resins.

The line of demarcation between enamel and paint is sometimes hard to define. Generally, paint is pigment—often times lead oxide—in combination with vegetable oil; such as linseed oil.

Generally, enamels dry harder and quicker than paint. Paints are more often used on surfaces exposed to outdoor weathering, such as buildings, bridges, and the like. Enamels are more often used for industrial purposes where quick air-drying or baking is desirable. There are exceptions to this rule. —R. J. FAIRBURN.



Water-wash spray booths with pressure tanks overhead, for spraying airplane parts. Photograph, courtesy of Binks Mfg. Co.

Paints FOR THE Gods of War

BY PAUL O. BLACKMORE
Chief Chemist, Ault & Wiborg Corp.

AMERICAN industry has gone to war. Airplanes, tanks, trucks, guns, bombs, and ammunition are pouring out of factories that a short year ago were manufacturing automobiles, refrigerators, washing machines, sink cabinets, and all of the many other comforts and conveniences that have made our standard of living the highest in the world.

Miracles have been wrought in the conversion of many of our factories to wholly new lines of endeavor—miracles that could be performed only by American industrialists. Our hats are off to them. They have done their jobs—and well.

It is the purpose of this article, however, to present an intimate story of the contributions another industry has made to the war effort. The Ault and Wiborg Corp. has a new war slogan, "It's a Fight to the Finish." It might well be a slogan for the entire paint industry, for truer words have never been spoken. Achievements of the paint industry have, perhaps, been less spectacular than synthetic rubber—certainly they have been less publicized—but they are none the less vital to the successful prosecution of the war. If, instead of overrunning rubber plantations, the Japs had overrun territory that was vital to the production of paint raw materials, we would not have gasoline rationing, and we would have plenty of tires for our automobiles, tanks, trucks, and aircraft, but we could not drive them into battle because they could not be protected from the demon rust, nor could they be hidden from the prying eyes of the enemy by means of camouflage.

Why Paint is so Essential on Tanks

Let us look at one of those monster tanks coming off the assembly line. What part did the paint industry play in its construction? The first thing that attracts our eyes is the lusterless olive drab enamel that covers its huge bulk. While it might not appear so to the casual observer, this paint is unique. In the first place, it is a color of low visibility. Secondly, it has a low specular reflection. In other words, it scatters the light that impinges upon it, thereby eliminating the risk of detection by means of a telltale glint. Thirdly, it cannot be polished. It must retain its low luster characteristics throughout its period of performance.

Underneath this olive drab enamel is a red oxide zinc-chromate primer which serves the two-fold purpose of providing good adhesion or bond for the enamel, and pro-

tecting the metal from rust. It will give this protection even though the film may be damaged by flying fragments, because zinc chromate has a reaching power bestowed upon it by a chemical action known as "ionization" which sets up innumerable zinc-iron galvanic cells producing "eddy currents" in the metal and inhibiting oxidation or rust.

War Tank Accessories Must Be Painted Too

Projecting from the turrets are the powerful guns which are protected in much the same manner. We step inside and find the interior painted a dazzling white, which not only provides rust protection, but also serves to increase visibility, making the most of what light is available. Ammunition boxes are also painted white in order that they may be easily located. The seam and gasket compounds which serve to make the box water tight and "keep the powder dry" are products of the paint industry. The radio has a wrinkle finish on it. Even the tubes inside of it have their bases painted with a black baking enamel. Shell compartments are painted with a white enamel of extremely high abrasion resistance, since they must withstand the wear and tear of the heavy shell being dragged in and out. The water cannister is painted olive drab on the outside, and lined on the inside with a sanitary, odorless, tasteless finish that will keep its contents pure and free from metal or rust contamination indefinitely. Hundreds of thousands of pounds of valuable tin are thus saved for more vital purposes. So much for the tank.

Spraying blitz cans. Photograph, courtesy Eclipse Air Brush Co.

Why and Where Paint Is Used on Big Bombers

Now let us examine a big bomber. Its aluminum fuselage and wings are protected from corrosion with another highly resistant zinc-chromate primer. Over this is applied an aircraft lacquer or enamel of suitable color, generally olive drab. On the wings are painted a white star on a blue background, the insignia of the American air force. Within the ship are mile after mile of electrical wires and cables, the nerve network without which there could be no control. These cables are insulated with lacquers of high di-electric properties to prevent electrical losses or short circuits. They must not be weakened or otherwise affected by hot oils and greases. They must not blister under excessive heat nor must they become brittle and crack at 40° below zero stratosphere temperatures. Neither must they support combustion. Certain types of propellers are protected from flying sand and other wind-borne abrasives, as well as from corrosion by highly resistant baked enamels.

Because aluminum is not sufficiently abundant for all types of ships, some of them are being made of plywood. Here again the paint

technician meets a challenge. Plywood must be treated to prevent mildew or fungus growth. It must be sealed and waterproofed to prevent warpage and cracking. Irregularities must be eliminated with fillers and surfacers to keep the aerodynamic resistance at a minimum. Finally, the necessary camouflage colors and insignia must be applied. All of this must be accomplished with a minimum of weight in order that the useful load of the plane shall not be seriously diminished. Even the inside of the wings and fuselage must be sealed to protect them from moisture that condenses at high altitude low temperatures.

Again, we have the electrical system to protect. Even on the instrument dials, paint plays an important function. The colors provide contrast by day; and at night, where a light in the sky would evoke a rain of antiaircraft fire, by merely pushing a button, the pilot can illuminate the dials with a soft fluorescent glow by means of black light, rendering the numerals clearly visible to his dark-accustomed eyes and avoiding the necessity of their having to become dark-accustomed all over again, for immediately upon releasing the button, darkness reigns supreme.

Gliders; Landing Mats; Expeditionary Cans

In glider construction, the metal framework of the fuselage must be protected with zinc-chromate primer. The wooden framework of the wing, the struts and braces must be fungus-proofed and waterproofed. The airplane fabric is then stretched over the wings and fuselage after which it receives numerous coats of aircraft dope which fills the fabric, shrinks it, and makes it taut. Over this dope, topcoats and insignia are applied.

In conditions of actual combat, airfields have to be hurriedly constructed in the vicinity of front lines. Sometimes portable steel landing mats are laid down to serve as temporary runways. These must be protected from corrosion and must be adequately camouflaged.

Five-gallon expeditionary cans for water and gasoline must be lined with a protective lining to keep the contents pure and to prevent them from attacking the container. These cans may be called upon to carry other liquid foods or beverages such as soup, coffee, milk, etc., to which they must not impart an odor or taste, and by which they must not be attacked. After each such use, food containers must be sterilized with live steam to make them ready for their next assignment—a large order for any organic coating to fulfill.

In addition to the small containers, trailer tanks for transporting larger volumes of liquid materials must be similarly protected.

Chemical Warfare Service has any number of corrosion problems, many of which have found their solution in the paint industry.

Ordnance Painting; Shells Painted Inside and Outside

Ordnance also comes in for a large share of attention. All ammunition from bullets to bombs meets up with the paint technician somewhere along the line. Shells of all caliber are painted for protection and for identification on the outside, and on the inside with acid-proofing coatings to protect them from their contents. Bombs, fins, and the steel crates which contain them are painted either olive drab or yellow. With a critical shortage of copper and zinc with which to make brass alloys, steel cartridge casings are rapidly coming into the picture, and with

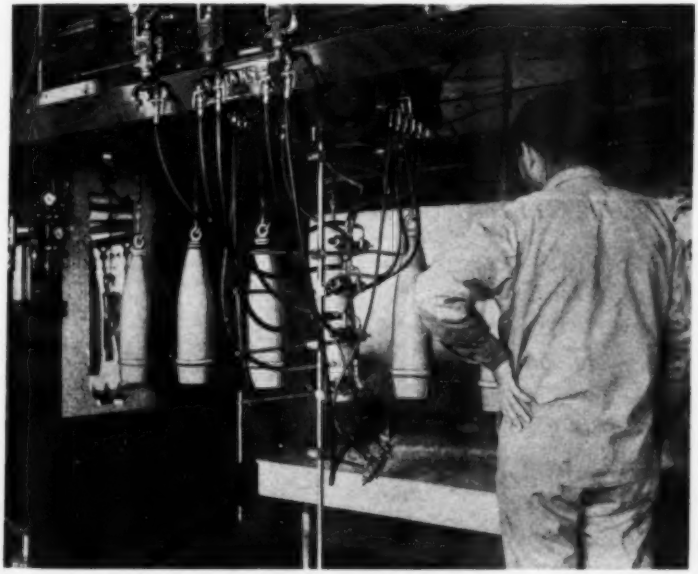
them, a new problem for the paint technician.

Again the problem is one of corrosion. Shells must be protected on the outside from water, salt air, etc.; and on the inside from attack by the chemicals which go to make up their powerful explosives. In addition to being corrosion resistant, they must also be non-thermoplastic at elevated temperatures. Gun barrels may reach temperatures of several hundred degrees during rapid firing. Obviously, if the coatings became soft at these high operating temperatures, jammed guns would inevitably result.

The painting of untold thousands of these steel cartridge cases is no small task. Speed, as well as a thorough cure, is essential to keep up with present-day production schedules. The paint industry has met this challenge, with speed-curing finishes that comply with production requirements.

Soldiers' Wearing Apparel and Accessories

Now let us take a look at the doughboy himself. On his head he wears a steel or plastic helmet, or both, which is coated with a specially "textured" finish which not only protects the helmet from the ravages of the weather, but also, by virtue of its rough surface, aids in concealing him from the enemy. The "textured" surface coating will not rub up shiny, even under severe conditions of use. If he wears goggles, the frames and eyepieces are protected by a corrosion-



Applying final coat of paint to 155-mm. projectiles. Photo by U. S. Army Signal Corps.

resistant lacquer or enamel. Furthermore, the eye-pieces are painted before final fabrication and must withstand subsequent crimping operations without chipping or cracking of the finish.

The metal parts of his gas mask, even to the spare charge of activated carbon, require a protective coating. His raincoat, deprived of rubber more vitally needed elsewhere, is waterproofed with a chemical coating. The tent in which he seeks shelter is waterproofed and fireproofed with products of the paint industry. Even the tiny grommet rings have not escaped attention. Nor has the cot on which he sleeps or the metal trays upon which he receives his food. The can in which the food is delivered contains a sanitary lining which assures him that its contents will be pure and wholesome whenever or wherever in the world he may choose to consume it.

Camouflage Painting; Infra-Red Reflectance

And now we come to one of the most intriguing as well as one of the most important contributions of a paint industry at war. We refer to the art of camouflage.

Down in old Virginia, nestling on the banks of the Potomac, not far from Washington, is Fort Belvoir, the home of the U. S. Army Engineers. They are the fellows who build the bridges, roads, camps and airfields, and provide them with water, power, and other necessary facilities. They, too, are the ones who must conceal these vital installations from observation by the enemy, in so far as it is possible to do so. The Camouflage Section, therefore, has a man's size job. The officers and personnel work on new ideas to make things appear to be what they are not. "Protective Concealment" they call it, but when it comes to making things disappear, the magic they perform would put Houdini to shame. They juggle shadows, making them appear where they should not be and eliminating them where they should be. They make roads appear to go right over the tops of buildings. They hide the buildings themselves with camouflage nets and on their roofs erect barns, houses, haystacks, gardens, etc., to fool the enemy. They have studied the leaves of trees to determine their spectral reflectance characteristics in order that their camouflage will be a faithful duplication not only to the casual observer but also to the eye of the infra-red aerial camera.

Their task is to match the texture and color of the surrounding terrain and to eliminate man-made regularities which do not occur in nature.

For the duplication of texture you will find in their bag of tricks leaves, branches, dirt, stones, steel wool, glass wool, paper, cloth, moss, and even chicken feathers. For the duplication of color—yes you have guessed it—paint.

Camouflage Paint Requirements Are Severe

And here begins the story of the development of one of the most unique products the paint industry has brought forth in World War II. When the Engineers have to paint, they generally have to paint right now. If the army has moved to new positions during the night, those positions must be camouflaged before morning. They cannot wait for favorable drying weather. Rain or shine, warm or below freezing, the paint must go on. New wood or old, rusty metal or clean, cloth or paper, even earth; it all makes no difference; the paint

must go on. It must be applied by troops, not by master painters. There might even be no brushes or spray guns with which to apply it.

Early in the spring of 1941, when the inevitability of the entrance of the United States into the world conflict was already quite apparent, the Engineer Board called together a group of paint technicians and outlined to them the specifications of the perfect camouflage paint. Here are some of the things they wanted:

1) Low bulk and weight. The problem of supplying an army in the field is a huge one. Therefore, the greater number of square feet of coverage that can be packed into a gallon of paint, the fewer the cans that need to be carried and the greater the space made available for food, ammunition, and other necessities. So this paint must be concentrated and take a tremendous reduction.

2) Reducibility with readily available solvents. They could not haul around huge quantities of VMP naphtha, xylol, or other inflammable solvents. They might just as well transport the diluted paint ready for use. The paint technicians said they would settle for gasoline. The army has to carry that.

But the Engineers reminded us that since gasoline might well have to be transported for thousands of miles, it could hardly be classed as readily available. What, then, did they mean by a "readily available" solvent? There was only one answer. Water! Except perhaps in the deserts, water is readily available.

We have heard a great deal in the last few years about emulsion paints. They were used extensively to produce the colorful effects at the New York World's Fair. But these would not do. They were not concentrated enough and they were subject to freezing. The Engineers wanted a paint that contained little or no water (maximum 2%) as packaged, but yet one that would, without the aid of high speed agitation or emulsification equipment, accept water as easily as most paints accept toluol (remember?).

3) Reducibility with gasoline (as well as water) so that the paint might be applied in freezing weather.

4) Application by brush, spray, dip or wipe. Use of brooms not restricted.

5) Application to wood, metal, or camouflage fabric with equal facility.

6) Must be fungus-proof.

7) Must not contribute a fire hazard to cloth coated with it and subsequently stored in depots, which of course eliminates drying by oxidation.

8) Must have a flash point over 100° F. to insure safe use in the field.

9) Must not unduly stiffen the camouflage fabric, thus preventing proper "drape."

10) Must not "leach" or lose its color when soaked in water.

11) Must not fade appreciably in 300 accelerated weathering hours or in six months outside exposure.

12) When reduced with an equal volume of water, six cubic centimeters of it must provide solid hiding on a black and white hiding power chart.

13) It must mix in all proportions with casein paint with which the depots were already plentifully stocked.

14) It must have infra-red reflectance properties within certain limits as set up by the Engineer Board.

Paint Technicians Produced What Seemed Impossible

A large order, to be sure, but the technicians came through, although not without their headaches and some false starts. At the present writing, however, over a million gallons of this camouflage paint have been ordered by the Engineers and is being delivered by the paint industry.

Water is mighty cheap, and it is odorless, tasteless, non-toxic, non-inflammable, and available anywhere. Perhaps our wartime developments of camouflage paints will suggest revolutionary changes for peacetime industrial finishing.

"One-Mission" Camouflage For Temporary Service

Another interesting development in the camouflage field is known as a "One-Mission" camouflage paint. It frequently becomes necessary to temporarily camouflage a plane or a piece of armored equipment for a brief space of time. In such a case, it is desirable to remove the coating easily and quickly. Water-soluble paints containing glue, dextrine, gelatin, and other water-soluble compounds, which can be easily removed by flushing with a hose, have been more or less successfully used. They have several drawbacks, however. They are relatively low in solids, often less than 40%, due to the high-viscosity solutions obtained from the water-soluble film-forming agents that are used. They are subject to putrefaction. They freeze in cold weather. They are subject to premature removal in a rainstorm.

A new "One Mission" camouflage paint has been developed which has the following unique features:

1) It is supplied in concentrated paste form containing 85% solids. Thus considerable bulk and weight are saved. The space required to transport more than 60% of water can be used for more profitable and vitally necessary material.

2) The 15% of volatile matter is non-aqueous and, therefore, the paint is not subject to freezing.

3) The volatile matter and film-forming solids are soluble in alcohol or gasoline and readily emulsifiable with water, offering three possibilities for reducing the paste to usable consistency.

For Semi-Permanent Camouflage Paint Jobs

4) The material may serve either as a very temporary coating or as a semi-permanent one, depending upon how the paint is mixed before application. With it is supplied a powder known as "Chemical A." When a very temporary paint is desired, ¼-lb. of "Chemical A" is added to each gallon of water to be used in reducing the paste. In the case of colors, three gallons of water are added to one gallon of paste for spray work. Black will take four gallons of water. The resulting mixture drys in a few minutes to a lusterless finish.

When the camouflage has served its purpose, the paint can be easily removed with a hose, or by lightly sponging with water. When the Chemical "A" is added to the reducing water, the paint is also subject to premature removal in a rainstorm.

If rain is expected during the time the paint is to conceal the object upon which it is applied, the Chemical "A" is not added to the reducing water. Without Chemical "A" the paint will withstand a hard rainstorm within a short time after it is applied. When removal is desired, Chemical "A" must be added to the removal water.

In freezing weather, water cannot be used either for application

or removal. Either gasoline or alcohol may be used for both application and removal without the addition of Chemical "A."

5) The paint is not subject to putrefaction.

Comparison between this new "One-Mission" camouflage paint and one of the earlier types showed that it was possible to cover a given area to an equal degree of hiding with a weight amounting to only 20% of that formerly needed. The value of such a saving in weight and bulk to an army in the field cannot be overemphasized. The water-solubility and ease of removability can be varied widely by varying the amount of Chemical "A" in the reducing water. Chemical "A" will not harm the permanent finish on the plane, nor will it attack any aluminum metal with which it may come into contact.

Temporary Protective Coating for Clean Bare Metal and Plastics

Another interesting development that is playing an increasingly important role in the war effort is a new temporary protective coating for aluminum, stainless steel, nickel, chromium, and plastic sheets. The coating, known as "Protektol," is available in two types; one for metals, the other for plastics. It may be applied by spray, brush, dip, or roller coating. The film dries rapidly, developing high tensile strength, but low adhesion. It is highly resistant to scuffing and abrasion, and thus prevents damage of highly polished surfaces from grit or other abrasive substances, as well as from harsh dies or tools which may be used during subsequent fabrication.

Having served its purpose, it is removed by merely lifting a corner and peeling the coating from the surface. It removes with it any dirt or grease that may have contaminated the surface, either before or after the Protektol was applied, leaving it clean and ready for subsequent painting. The stripped films, if carefully collected and baled, can be reclaimed by putting them back into solution in the proper solvents and filtering out the foreign matter.

Available in Colors; Easily Removed and Salvaged

Protektol is available in a clear and in several transparent colors. Since the tensile strength is partly a function of the film thickness, it is important that the dry film thickness is maintained above a certain minimum, which is one mil for the metal type and 1½ to 2 mils for the plastics type. The transparent colors aid the spray man in applying a suitable heavy film, because he soon learns to what depth of color he must spray to yield an easily strippable film.

The colors may also be used to identify one class of sheet from another, and, in addition, they call attention to incomplete removal.

A unique method of removal is to prick the film at any given point and apply a strong jet of air to the hole. The air will creep under the film, inflating it like a balloon, and thus the film can be completely blown off the surface.

In addition to the several transparent colors, this material is available pigmented with zinc chromate, in which form it acts as a temporary rust-inhibiting primer.

In cutting and stamping operations, layout work can be done right on the protective film and removed with it when it has served its purpose. It also permits visual inspection of the object at all times. In this respect, it has a distinct advantage over adhesive paper coatings which have been extensively used.

The film-forming ingredients do not oxidize or polymerize. Therefore, the films, on aging, do not gain in adhesion and become difficultly removable.

Protektol is particularly suitable for use on methacrylate and cellulose acetate plastic sheets used in modern aircraft construction for windows, etc. Scratches on the plastic sheet would seriously impair the vision of the pilot, navigator, and bombardier. It is also suitable for use on phenol-formaldehyde and urea-formaldehyle plastics. It will not work on ethyl cellulose or polystyrene.

In addition to its contribution to the direct war effort, the paint industry has played an important role in the field of civilian defense.

The camouflaging of vital defense plants has taken huge quantities of paint materials. Fortunately, no bombs have yet been dropped on continental United States soil, and Heaven grant that we may be spared the experience, but if it should happen here, the paint industry will be found ready to supply the huge quantities of blackout paints and luminous paints that will be required.

Blackout Paints and Requirements of Same

Blackout paints must perform two functions. They must prevent light from within the building getting to the outside, and they must reduce the ability of the glass to reflect outside sources of light such as fire, search-lights, moonlight, etc. They do not necessarily have to be black as long as they are completely opaque. They may be gray or any other color that will blend well with the surroundings. *One of the primary rules of camouflage is to avoid sharp contrasts.*

Black paints generally absorb considerable amounts of heat. Windows have been known to break due to excessive expansion of overheated, blacked-out window panes. Fortunately, our studies of infra-red reflecting camouflage paints have shown us how to make blacks that reflect heat as well as light. These infra-red reflecting blacks may be incorporated into the black-out paints, thereby materially reducing, if not completely eliminating, the danger of window breakage.

Since paint films are more or less transparent to infra-red energy, even higher reflection may be achieved by painting the inside of the glass white. This also has the effect of making the interior of the building brighter and more cheerful, largely nullifying the adverse psychology of working in a blacked-out building.

Removal of Blackout After the War

One of the most discomforting thoughts about blacking out a building is the prospect of having to remove the paint on the day that peace once more blesses the Earth. This task has been rendered considerably less formidable by the development of a blackout paint that does not require removal by means of solvent. Applying the "Protektol" principle previously described, this paint can be removed by a few strokes of a sharp-bladed putty knife, or a razor blade in a suitable holder. Thus, smearing the window sills or the sides of the building with paint and paint remover is eliminated.

Luminous Paints—Phosphorescent; Fluorescent

In the event that American cities are required to blackout extensively, luminous paint will perform an

● Many an Air Corps Repair Dock wears a coat of Johnson's Paint. These metal "nests" to which American "eagles" return for periodic checkup NEED such protection . . . not only against corrosion and rust, but also to hide them from enemy eyes.

Many ship surfaces, tanks, Army bicycles, now have the protection of approved Lustreless Olive Drab Enamel made by S. C. Johnson & Son, Inc. And well-known Johnson's Wax-O-Namel . . . a special wax-fortified paint . . . is playing its part in the war effort, too, being used on life rafts, cartridge and powder storage tanks, on shell boxes, on Victory bicycles.

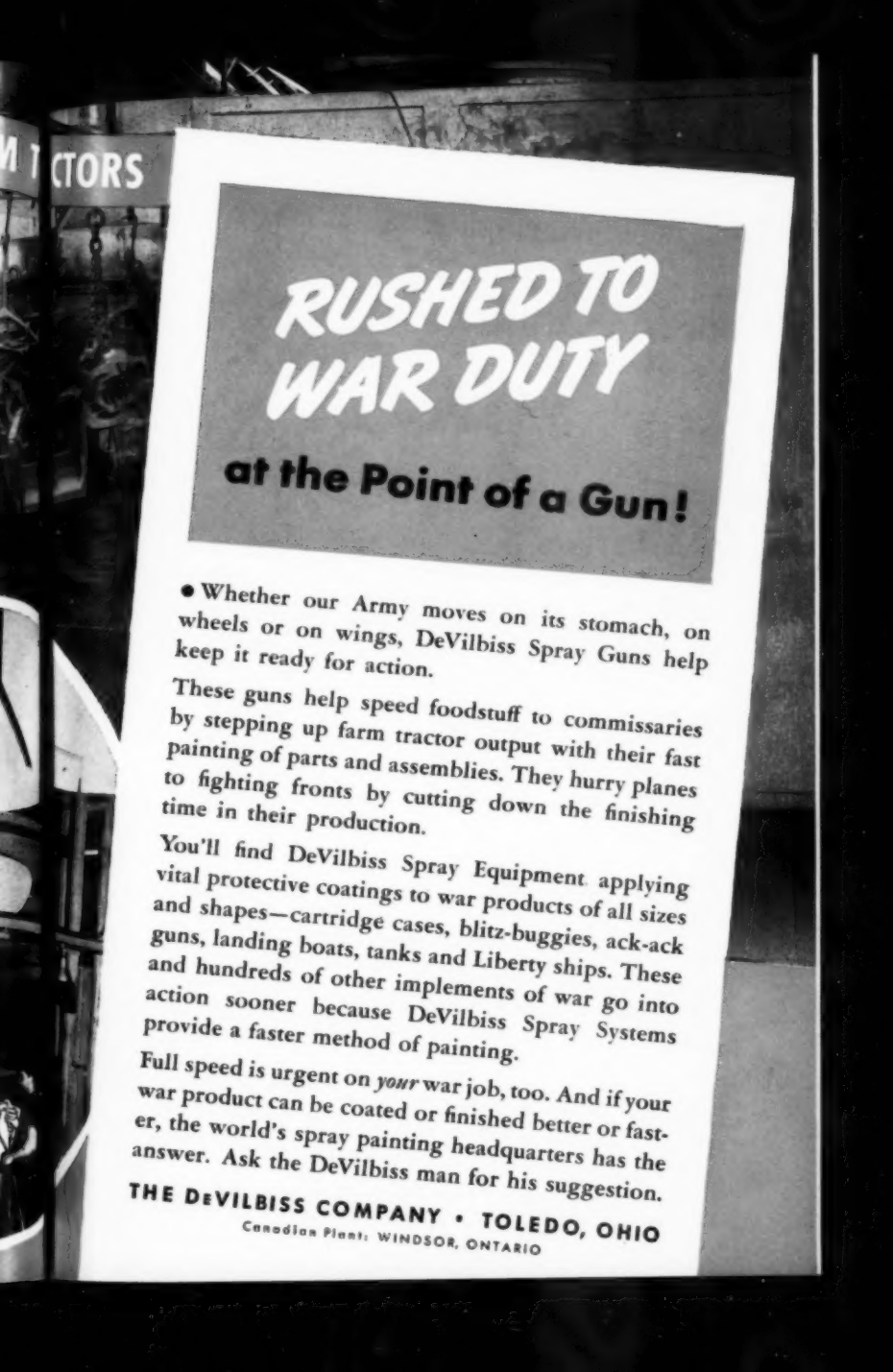
Are you a war materials contractor with paint problems? Our Product Finishes Division is well equipped to supply a great variety of paints and finishes, or develop new coatings and processes for tough jobs. Write

Buy U. S. War Savings Bonds and Stamps

S. C. JOHNSON & SON, INC.
PRODUCT FINISHES DIVISION
Department IF-13,
Racine, Wis.

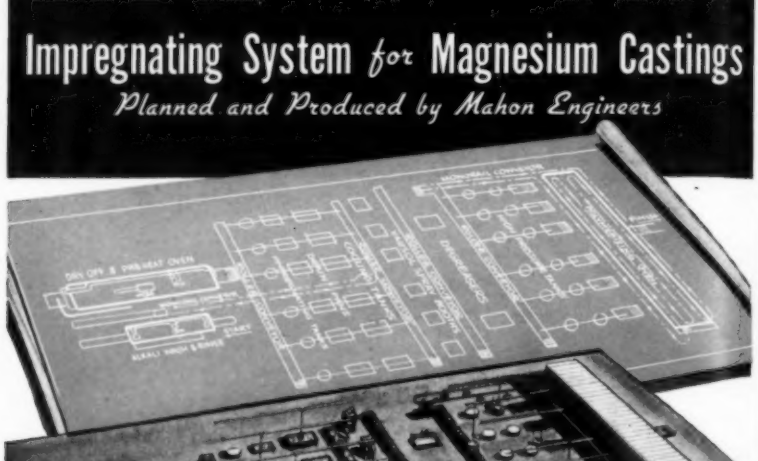
(ABOVE) Spraying Caterpillar tractor parts in a 60-foot down-draft DeVilbiss Spray Booth. (RIGHT) DeVilbiss Spray Equipment and Water Wash Spray Booth speed the finishing of plane wings at Fleetwings, Inc.

DeVILBISS
SPRAY SYSTEMS


RUSHED TO
WAR DUTY
at the Point of a Gun!
• Whether our Army moves on its stomach, on wheels or on wings, DeVilbiss Spray Guns help keep it ready for action.
These guns help speed foodstuff to commissaries by stepping up farm tractor output with their fast painting of parts and assemblies. They hurry planes to fighting fronts by cutting down the finishing time in their production.
You'll find DeVilbiss Spray Equipment applying vital protective coatings to war products of all sizes and shapes—cartridge cases, blitz-buggies, ack-ack guns, landing boats, tanks and Liberty ships. These and hundreds of other implements of war go into action sooner because DeVilbiss Spray Systems provide a faster method of painting.
Full speed is urgent on *your* war job, too. And if your war product can be coated or finished better or faster, the world's spray painting headquarters has the answer. Ask the DeVilbiss man for his suggestion.
THE DEVILBISS COMPANY • TOLEDO, OHIO
Canadian Plant: WINDSOR, ONTARIO

Impregnating System for Magnesium Castings

Planned and Produced by Mahon Engineers



From the illustrations above it is a simple matter to follow through the various steps incorporated in this impregnating process. Extensive as the installation is, covering an area, 210 ft. long by 76 ft. wide, it is remarkably compact and permits of rapid time-saving handling along the entire line of travel.

● The magnitude of today's aircraft engine production requires a daily output of many thousands of magnesium castings. As magnesium castings are extremely porous, they must be thoroughly impregnated with tung oil in order to seal the pores.

The installation, pictured above, was planned and built for this purpose by Mahon engineers. It is now in the process of installation for one of the foremost aircraft engine builders engaged in large volume war production.

The ability of Mahon engineers to produce such a system is tangible assurance of the specialized assistance they can extend to you. For years they have been concentrating on the development of equipment essential to product finishing and the many processes related thereto. The knowledge they have acquired is completely at your disposal.

Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Air Supply Units, Hydro-Filtered Air Collectors — and Many Other Units of Special Production Equipment — Including Complete Finishing Systems.

THE R. C. MAHON COMPANY • DETROIT • CHICAGO

MAHON

important function in aiding the nocturnal movements of the unhappy citizen.

There are a number of different kinds of luminous paints. Some of them are radioactive, meaning that the light producing energy is generated within the substance itself, perhaps by molecular disintegration. These radio-active substances emit destructive short-wave emanations which can cause injury or even blindness. Their use should be left to those skilled in the art of handling radio-active substances.

The non-radio-active types require external activation. These may be further subdivided into *a*) phosphorescent paints, which may be activated by sunlight or artificial light and which glow for several hours after the exciting light source is removed, and *b*) fluorescent paints which *must* be activated by ultraviolet light and whose glow ceases almost immediately upon removal of the exciting source.

Fluorescent paints, for the most part, glow much more brilliantly than the phosphorescent paints, and as long as the exciting source is available, they do not diminish in intensity. Their intensity, however, is partly a function of the intensity of the ultra-violet source, and since high intensity ultra-violet generation requires expensive and rather cumbersome equipment, a widespread use of fluorescent paints is doubtful.

Three General Types of Phosphorescent Paints

Phosphorescent paints, on the other hand, will glow for a number of hours after having been excited for 10 or 15 seconds with a strong Mazda bulb. This glow diminshes rapidly within the first few minutes to a certain point at which the rate of decay levels off and diminishes slowly for several hours.

There are three general types of phosphorescent paints. The most brilliant, and incidentally the most expensive, contain activated strontium sulphide. They have high initial brilliance and longer duration of glow than either of the other two types. The strontium paints glow with a bluish-white light.

Activated zinc sulphide paints glow with a greenish-yellow light. They have high initial brilliance but fall off very rapidly to a low level of intensity.

Activated calcium sulphide paints have a fairly good initial brilliance and maintain it rather well. They glow with a purplish light which, by its very nature, is less visible than the greenish-yellow of the zinc or the bluish-white of the strontium. They are the least expensive, which strongly recommends them. They can be pepped up with varying additions of the strontium salts. The cost goes up in just about direct proportion to the improvement obtained.

Prices and How Used

Phosphorescent paints are available at prices ranging from $15.00 to $60.00 a gallon. The customer gets, in initial brilliance and duration of glow, just about that for which he is willing to pay.

Phosphorescent paints are usually applied as part of a multiple-coat system. A white primer coat is desirable to: 1) provide adequate bond and sealing to the surface in question, 2) protect the phosphorescent paint from moisture or acidity from within, and 3) provide a highly reflecting background in order that maximum use may be made of the available light.

It is desirable to apply at least two coats of phosphorescent paint over the white primer. The degree of brilliance is partly a function

of the concentration of pigment particles in any given area. Therefore, two coats will yield considerably more brilliance than one.

The phosphorescent paint should then be protected by one or more applications of a clear protective coat. This, again, is to protect the paint from atmospheric moisture and acidity, both of which are poisons to the paint and sharply reduce its efficiency.

This sounds like a complicated procedure, but since even the cheapest phosphorescent paints are still very expensive, it pays to spend whatever is necessary in time and labor to insure proper application and thereby gain the greatest possible life.

Provided they are not subject to dirt accumulation, they will last for quite a long while indoors. Their outdoor durability is limited, and is probably not in excess of 30 to 60 days.

While the intensity of their illumination is low (of the order of about two microlambers after the first few minutes) they are brilliant enough to point out exits, shelters, corridors, etc., in the event of sudden power failure. As the eye grows accustomed to the blackness, the paints seem to gain in visibility. Actually, they are continually losing in intenstiy but the eye gains in sensitivity.

Countless Other War Paints

That just about brings us to the end of our story. I have mentioned, in the preceding pages, only those wartime paint applications with which I am personally familiar. There are countless others which have not been mentioned. One needs only to look about to find them, and to realize that the part they play in waging an all-out mechanized war is, perhaps, less spectacular but none the less vital than the oil without which we could not keep our planes in the skies and our tanks in the field.

If any further proof were needed, we could call attention to the fact that the War Production Board has set up a Protective Coatings Section whose job it is to see that the raw materials for these war paints are not misused and that they are directed into the channels where they are most urgently needed.

About the only raw material we have left, which is not on priority and being reserved for war use, is rosin.

Paint went to war long before Pearl Harbor and it will be on hand to protect the flagpole from which Old Glory will wave on the day of victory. It's a fight to the finish.

Hilo Trimmed for War Work

Hilo Research Laboratory now has one corner set apart with all necessary chemicals and equipment for use in testing by inspectors of the Maritime Commission, according to a statement issued by the Hilo Varnish Corp., Brooklyn, N. Y.

A new weatherometer and a new salt-spray cabinet are working around the clock and every day subjecting protective coating test panels to the destructive elements in these machines —to make certain that the coatings will meet the severe requirements of Government use.

Twenty-four infra-red baking lamps in two banks are helping to tell quickly the harrassed war-goods manufacturer, whether or not this method of drying his protective coatings will help speed his program.

For necessary gloss reflection, whether extremely low or exceptionally high, and for reflection by infra-red light, the newest model Hunter reflectometer gives its accurate measurement against the reflection of the pure white of magnesium.

Delicate electrical-measuring equipments have been installed to check insulating varnishes for the exacting need for Government use. One measures Dielectric strength and the other resistance to acids over long periods of time.

These new acquisitions, together with the various types of viscosimeters, abrasive resistance testers, etc., give Hilo an unusually complete equipment for a company of its size.

A Forecast on Finishes

What the future may hold in store for concerns who make, sell and use finishing materials, and how the new set-up may affect you . . .

BY H. H. MILLER

AN ERA OF speculation is upon us! Statesmen speculate upon the World Order after the war. Economists speculate upon the needs and conditions of the world; and the military speculate on the proper method of policing the earth to prevent future wars. It might be in order, therefore, to speculate briefly on the future of industrial finishes in the post-Hitler era.

Turning first to the raw materials available, we are confronted with a host of newcomers—many not available now except for priority finishes, but sure to be abundant later. Let us consider just two classes.

Oils and Resins. Besides our first love, dehydrated castor oil, we now have, among others, the rebuilt linseeds like Kellin, 710 oil, Esskol; and Solinox to replace castor oil in lacquers; also, soya refinements like Kellsoy and the tri-glycerides, Neo-Fat, Celesterol and Hyodol.

Does it tax the imagination too much to believe that out of these just mentioned, and many others, possibly even from petroleum, could come the one that will replace China wood oil, as Nylon has replaced silk? It could happen!

Resins: There is mystery and magic even in the names of our synthetic resins, for example, alkyds, phenolics, maleics, melamines, carbics, pentalyns, polypale rosin, urea-formaldehydes, chlorinated rubber; and let's include all of the cellulose esters.

From the rate these resins are being developed, is it not possible, simply by the law of averages, that one may make obsolete all of our present finishes, and perhaps make unnecessary all of our oils, even that old campaigner linseed oil? The last war gave us nitrocellulose lacquer. Is some such new finish in the offing?

Having gone this far, we might consider next: Who will use these fine products we envision? Let's look at a few.

More Plants Tooled Up For Product Painting

1—It is probably safe to assume that we will not go in for wholesale disarmament when Hitler, Mussolini and Tojo are eliminated. That leaves Uncle Sam, then, as a customer to be reckoned with. Will not more and more time be spent in developing newer and better finishes for battleships, tanks and airplanes? Our chemists and sales

executives have become "Government Paint" conscious, and it seems as though such business would be much sought after, and that competition would be keener than ever.

2—Remember that hundreds of industries which used industrial finishes sparingly and in a crude fashion before the war, now have modern finishing departments, automatic spraying and dipping equipment, infra-red ovens, etc. More, they have personnel thoroughly capable of using all types of industrial finishes. Can we assume that these will be left unused after the war? I believe not. Therefore, we immediately have hundreds of potential customers. This alone makes the future of the industry look brighter.

No use stopping now. We may as well consider what kinds of finishes these customers will demand. We can do it by dividing up the field according to the type of surfaces and products to be painted. Among them we find:

Types of Surfaces That Will Call for Paint

Aluminum: The vastly increased production of this metal means that it will compete with tin and steel in many fields. Do we have the best possible finishes now for aluminum? Better ones are sure to be found. They may be the conventional types, or a chemical treatment of the metal.

We can expect to have aluminum bicycles, toys, automobile bodies, railway coaches, furniture, houses, filing cabinets, hardware, radio cabinets. It could be an aluminum era.

Plastics: What can finishes do in this field? Can we improve their beauty and durability? There should be a definite need for decorative finishes at least.

In the past, door liners and other parts of electric refrigerators were plastic, and they required finishing. Perhaps we will have entire refrigerators made from it, or furniture, or prefabricated woodwork, and wall coverings. From previous experimental work, plastic automobile bodies were found to be entirely practical. This would open an enormous field for new finishes.

Plywood: We are seeing now what plywood can do. Read, "They Were Expendable," by W. L. White. These motor torpedo boats were 70-ft. long, 20-ft. wide, powered by three Packard motors, traveled about the speed of a Packard on land, and they were made of—plywood! Training planes and gliders have been successfully made from it. What new finishes will we have to offer for plywood houses, toys, boats, airplanes, furniture, etc.? It promises to be a big field for development.

Fiber: Enormous strides are being taken in the utilization of this product. Successful containers for paints, etc., have been made from it. Might not fiber replace tin for cans? How will they be lithographed? Why shouldn't we have fiber table tops, prefabricated flooring, novelties, toys? And how about fiber automobile bodies, commercial car bodies, fuselages? Perhaps we shall see molded fiber fenders, cheap enough to discard when badly damaged.

Rubber: By the time this war is over synthetic rubber will be abundant and the natural product will be back on the market. How will it all be used? It seems certain that rubber will appear in many unsuspected guises. Why not rubber bumpers, fenders and wheels? Certainly rubber toys and novelties will be common.

Have we a really good finish for

These finishes are made by the chemical treatment of Gums—not with stearates. They produce a clear finish • will dull rub or polish • no haze after rubbing • will air dry or force dry • no printing • waterproof • liquor-proof • durable and economical. Full range of sheens.

PERFECTION
PAINT & COLOR CO.
INDIANAPOLIS, INDIANA

rubber, with sufficient flexibility and adhesion? It is sure to be needed and it offers distinct possibilities.

The foregoing ideas, suggestions and questions only scratch the surface, but they do indicate that chemists and formulators will need all the ingenuity they possess to keep abreast of the times.

What Finishes Will Be Popular

Undoubtedly these potential customers we have just mentioned—with all the variety of surfaces to paint—will also have some preference as to the finishes they will want. Why not explore this field a little? Consider these few possibilities:

Luster: Many manufacturers are using lusterless finishes, not only on tanks, trucks and airplanes, but on tool chests, automobile jacks, fire equipment and machinery—on wood and metal. They have found these finishes can cover a multitude of sins, for example, rough metal, spot welds, file marks, wood grain, knots, etc. Besides, these finishes dry to handle and to pack rapidly; and they are ideal from the standpoint of application. They can be sprayed, dipped or brushed. They have a definite purpose in time of war—elimination of glare. Couldn't we, in times of peace, do with less glare in some places, say on top of automobile hoods? In view of what has just been stated, plus the fact that they are now so familiar, they could be much in demand.

Colors: Everyone is familiar with camouflage and concealment colors. The names add attraction, so we will likely see more olive drabs, blue drab, warm drabs, desert sand, earth drab, earth red, earth brown, earth yellow, khaki, loam, Coronado tan, etc.

On the other hand, the pendulum may swing to the opposite extreme. We may enter an era of vivid colors, such as bright reds and crimsons, blues, greens, yellows, violets, lavender, etc. Perhaps we should consult psychologists to find out in advance what that trend will be.

Utility: What uses can we find for some of the special finishes with which we are now wrestling? Will we drop the finishes that have definite infra-red reflectances after all of our headaches in developing them? Or will we try to find some peace-time uses for them? Perhaps there are possibilities in the field of insulation and heat transfer.

We shouldn't overlook the nonskid coatings now used on ship decks and airplane runways. They could help cut down our alarming peace-time accident rate, both industrial and domestic. Wouldn't they be practical on step-ladder treads, basement steps, etc.?

The quick-drying primers, P-27b, 14080, AN-TT-P-656 have become quite common. They are used for many purposes and are applied by every production method, in thin coats or in full coats like enamels, on ferrous and non-ferrous metals. They have much to recommend them and will be improved on. Because of their speed of drying and general efficiency, such primers will probably be used more and more generally.

Besides the few materials just mentioned, every manufacturer of industrial finishes has spent much time in developing hundreds of others. These he will not want to discontinue and, with his knowledge of their properties, he will find many new uses for them.

Attitude of Customers

Purchasing agents, superintendents, and sales managers have become "specification conscious." The

PLYWOOD FINISHES

FOR 1943

TRAINERS · GLIDERS · CARGO SHIPS

OVER SEVEN YEARS OF PROVEN PERFORMANCE

Data on new systems of Tuf-On Finishes and schedules is now available. They meet government aeronautical requirements, so approval for their use may be obtained. Let us help you with your finishing problems.

SEND FOR **TUF-ON** SYSTEMS AND SCHEDULES

TUF-ON
PLYWOOD FINISHES

INDUSTRIAL RESEARCH DIV. OF WIPE-ON CORP., 105 HUDSON ST., NEW YORK

finishes they are using on war goods must meet the specifications of various branches of our armed forces. Properties hitherto unsuspected and unknown have become everyday matters to them now.

The post war purchaser may demand a complete laboratory report on each shipment. He may go still further and write a specification of his own. It seems safe to assume that you will find him a tougher, wiser and better informed individual than you knew before the war. He will be well aware of the values he got for his money during the war. We may find that elusive figure we call profit to have shrunk still farther.

Industrial Finish Salesmen

The post-war salesman will probably be like the one described in a recent booklet of the National Paint, Varnish & Lacquer Association, Inc., the title of which is "The Paint Industry in a War Time Economy." On page 9 of that booklet you will find the following:

"The salesman selling volume industrial finishes must be sufficiently technical, experienced and practical with the use of the material to present it properly and influence the choice of the practical operating man in the factory whose business he solicits.

"He should have the ability to diagnose and provide for finishing troubles. A change in the product of the customer must often be followed immediately by a change in the finishing material. To meet changing conditions, industrial finish manufacturers must have technically trained salesmen who are familiar not only with the materials of their own industry but the practical problems of their customers.

"It is obvious that in the industrial field, the finishing room is the bottleneck. The speed of the final process—finish—is the speed of the factory. Any trouble with the finishing material, whatever may be the cause, threatens serious loss, and must be eliminated without delay.

"Whether the cause is in the factory or the finish, the industrial finish manufacturer must immediately find the remedy. As a result, the industrial finish manufacturer must have constantly available specially trained service men who can be sent to a customer's plant on practically a moment's notice when trouble threatens or develops."

Conclusions as to Future

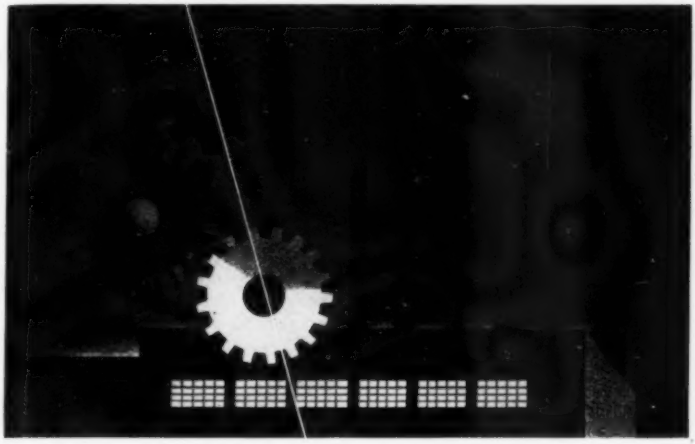
Perhaps then, the future of industrial finishes could be summed up as follows:

1) The field of potential customers will be much larger.

2) The raw materials available will be much more varied, and the supply will be vastly greater. Raw material prices may therefore be much lower.

3) Finish manufacturers, your customers will require more selling. Your sales efforts will have to be better and more practical. Users of industrial finishes have been buying from, and are therefore acquainted with many paint manufacturers where previously you probably had many customers all to yourself. You'll have to win them back, and it may not be easy. Long will they remember any lack of consideration you gave them while you were converting to war finishes.

4) The range of industrial finishes will be tremendously increased due to a wider choice of raw materials and the greater variety of surfaces to be finished. This could lead to further specialization, especially among the medium sized and small members



Demands of industry

Today's technical development is so rapid that it makes the progressive company of two years ago seem to have been standing still. Many of these developments are still military secrets, but you must take them into account NOW in your post-war planning. For today's advance becomes tomorrow's headache . . . unless it is in YOUR plant. What your competitor does affects your sales just as drastically as what you do yourself. Product improvements mean loss to you . . . unless they are YOUR improvements. Product improvements don't just happen. They usually require specialized engineering talent and research. It is our business to discover better ways to finish products . . . to cut finishing time, to lower finishing costs, to improve appearance and utility . . . to keep your product abreast and, if possible, AHEAD of competition. Your inquiry will incur no obligation. Address The Stanley Chemical Co., East Berlin, Conn.

Stanley Chemical

of our industry, many of whom will find it impossible to continue to keep up-to-date in all the fields in which they were active before the war.

5) Industrial finish salesmen will become more and more technicians. This will tend to give the industry more dignity and professional standing. Service will receive greater emphasis.

6) The industry's chemists and formulators will have to be expert in the utilization of new materials, and in suggesting and developing uses for old and new finishes.

7) Competition will be keener, but the merit of a finish will probably have more to do with its sale than has been the case in the past. Service will become a greater factor.

Salesmen, chemists, credit managers and in fact, all members of the industry have a great opportunity before them, and can be depended upon to take full advantage of it. All of us have the great challenge before us to make the next 25 years as great or greater than the last 25 years.

Spray-painting the windlass on a Liberty ship. Photo, courtesy Eclipse Air Brush Co.

We are in position to supply you with a vast amount of current information regarding application data, thinning ratios, drying schedules, etc., on Government finishes, as adopted by all branches of our armed forces.—Lowe Bros.

American-Marietta Co. Buys Ferbert-Schorndorfer Co.

Grover M. Hermann, president of the American-Marietta Co., Chicago, Ill., announces that his company has acquired The Ferbert-Schorndorfer Co. of Cleveland, Ohio. Mr. Hermann emphasizes that it will be operated as a subsidiary with no change in its present capable management.

David Andrew, who has been with The Ferbert-Schorndorfer Co. since 1930, will continue as its president. Guy Bartholomew, with the company since its inception in 1922, has been elected vice-president. Mr. Hermann has been elected chairman of the board.

The Ferbert-Schorndorfer Co. was founded some 20 years ago to specialize in metal finishes, by Al Ferbert and S. C. Schorndorfer, both of whom have since passed away. The company was successful from the start and enjoys an excellent reputation and large volume in the metal-finishing field. The original plant has been greatly improved and enlarged. Today it has the most modern equipment available for the efficient production of high quality paint, varnish, enamel and lacquer. Latest reports indicate that 95.7% of the company's present-day output is to provide urgently needed war finishes.

Grover M. Hermann, President of the American-Marietta Co., Chicago, Ill., which has acquired The Ferbert-Schorndorfer Co., of Cleveland, Ohio.

The acquisition of this company brings the American-Marietta Co. a substantial increase in its sales of metal finishes and gives complete diversification to its popular paint line.

ON THE WAR JOBS—

Hilo Protective Coatings Are at Work

HILO

1. ***Air Forces***
   Rip-pls, Zinc Chromate Primers and Synthetic Aircraft Enamels.
2. ***Shipping***
   Exterior and Interior Paints made to Specifications of the Maritime Commission and the Navy.
3. ***Ordnance***
   Lacquers for Ammunition, Acidproof Blacks, Finishes for Fighting Tools.
4. ***Chemical Warfare***
   Enamels and Lacquers for Specific purposes.
5. ***Corps of Engineers***
   Camouflage Paints.
6. ***These and Many Others***
   That fit various methods of application and process of drying.

Prompt attention will be given to your needs. Bring them to us or ask that a Hilo Technical Representative call.

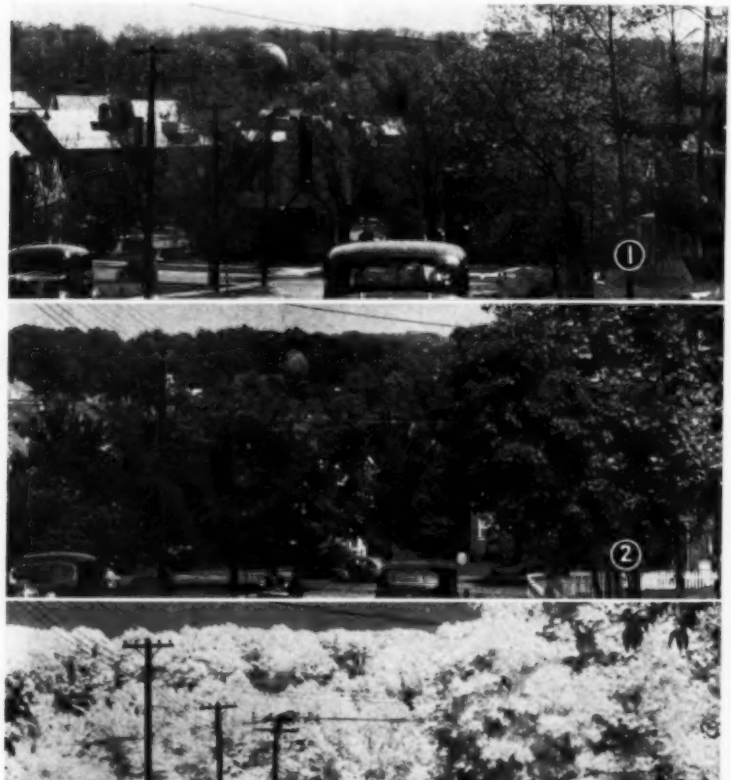
HILO VARNISH CORPORATION

Established 1863

42-60 Stewart Ave.
BROOKLYN, N. Y.

2420 Washburne Ave.
Chicago, Ill.

Park Square Building
Boston, Mass.



1) Regular photograph on panchromatic film shows bright reflection caused by sunlight striking exterior of an important scientific laboratory housing, before its aluminum-painted surface had been covered with "Infray" olive-drab paint.

2) After painting the scientific laboratory housing with "Infray" olive-drab, the structures blended into the surrounding foliage, without revealing any of the bright highlights which were present before painting.

3) Infra-red photograph from identical position, showing scientific laboratory housing after painting with "Infray" olive-drab.

Structures and equipment painted with ordinary olive-drab paints show up black on infra-red photographs in which all the greens of natural grass and foliage are white. The paint used on this laboratory, while undistinguishable from ordinary olive-drab upon visual examination, shows up just as white as the foliage in infra-red photographs. Photographs, courtesy of The Arco Co., Cleveland, Ohio.

Important Highlights
IN WARTIME PAINTING ACHIEVEMENTS

BY HOWARD E. WISE
President of The Arco Co.

AMERICA'S WAR NEEDS IN 1942 afforded the entire paint industry a great opportunity to prove its readiness to meet any and all demands upon it.

With America facing the possibility of aerial attack, for the first time in its history, paint has attained the importance of a major tactical instrument of defense. While even now the complete camouflaging of aircraft and other war plants, defense works and vital storage facilities, is limited to isolated locations in our coastal areas, American industry is alert, for the first time, to the implications of protective concealment.

Following our introduction, in the middle of 1941, of infra-red reflecting camouflage paint in dark visual colors, the value of such paints was recognized by the inclusion of infra-red reflecting requirements in several Government specifications pertaining to camouflage paints.

Infra-Red Reflecting Paint Provides Real Camouflage

When properly used in the art of camouflage, infra-red reflecting paints enable the camoufleur to make camouflage installations that are as effective under infra-red photography as they are visually, so that the problems of protection are now largely confined to the working out of suitable techniques for concealment of ground installations and combat equipment.

The extent to which inter-company collaboration has contributed to the solution of many war production problems is well illustrated by the steps which led to the successful development of camouflage netting in which glass fiber is used as a garnishing material.

Already familiar with problems encountered here and in England in the development of non-combustible garnishing material, our own research department contributed to the final solution by working directly with the manufacturers of glass fiber and the holders of prime contracts for camouflage netting. The result was a new and unique camouflage netting in the color and texture of natural foliage which, when photographed from the air under both panchromatic and infra-red photography, appeared to be the same color as natural foliage. In addition, it does not support combustion.

The same infra-red reflecting qualities in camouflage paints, which have contributed so much to perfection of the art of camouflage, have also contributed to the conservation of vital fuel supplies, since their use on storage tanks in

exposed localities permits the use of visually dark-colored concealment paints with a minimum of heat absorption.

Because they reflect heat generated by electric light bulbs, to a greater degree than do ordinary paints of dark color, these same paints are being used to blackout the seaward side of street lights in certain coastal areas to minimize the possibility of glass breakage.

New Paint System for Pre-fabricated Housing

To meet the needs of special war housing facilities, a new 2-coat system for pre-fabricated homes was developed. It includes a special rapid-drying weather-proof shop coat which can be applied on plywood, ordinary lumber or manufactured board without a preliminary sealer. If unfavorable weather conditions or scarcity of labor cause delay in application of the finish coat at the building site, the superior surface provided by this shop coat will prevent deterioration over an extended period.

While the restrictions placed upon the use of essential fats and oils, and the limited availability of certain raw materials create new problems, the paint industry's performance certainly proves the industry's capacity to meet any and every need, whether it be for ordinary maintenance, routine finishes or special war coatings and camouflage.

Watch Your Motors

ELECTRIC motors are the muscles of industry and if they are regularly serviced they will give dependable, long-time service. But neglect leads to breakdowns—with consequent interruptions in production—and, perhaps, to fire. Inasmuch as finishing and paint rooms are now largely mechanized and depend upon one or more electric motors, which may not be replaceable, it is timely to give consideration to their operation, maintenance and safety.

The following ten commandments of motor maintenance should always be observed but, at the same time, shops where motors are used should always be protected with suitable types of approved fire extinguishers. Vaporizing liquid and carbon dioxide are suitable for this purpose, since their contents are non-conducting and will not cause corrosion or otherwise damage motors.

1) Open-type motors should be blown out weekly; those operating under severe conditions, daily. Use no more than 50-lbs. of pressure to avoid possible damage to insulation.

2) Follow manufacturer's instructions in lubricating motors. Too much oil is as bad as too little, causing deterioration of insulation.

3) Inspect bearings weekly or oftener. Feel temperatures, examine for excessive end play, and make certain that the oil rings are working.

4) Inspect brushes and commutators weekly or oftener. Make certain that brushes are seated perfectly and commutators are smooth. Use the proper grade of carbon brushes to prevent wear of commutator and reduce sparking.

5) Where motors operate with excessive belt tension, check the air gap between rotor and stator every week. A monthly check of motors in average use is sufficient. Difference in the width of the gap around the circumference of the rotor will indicate the extent of wear on bearings.

6) Where motor leads are ex-

SPECIAL-LAC

The Perfect Successor to

Shellac

Has identical appearance—color—body—reduction—drying time. Completely WATERPROOF. Dries hard—has good adhesion—sands easily—cuts cost. Available in white and orange.

ORDER FIVE GALLONS AT DRUM PRICE

RUDD LACQUER CORPORATION
New York, N. Y.

Gentlemen: Please send us a five-gallon can of (white or orange) SPECIAL-LAC at drum price for a production test.

Name.....

Address.....

Signed.....

UNIFORMITY ★ QUALITY ★ PERFORMANCE

RUDLACO

RUDD LACQUER CORPORATION
127 MAIDEN LANE, NEW YORK
Factory—Rahway, N. J.

posed to view, check them weekly to see that connections are tight, well insulated and protected, and free from oil.

7) Inspect ground connections weekly, keeping them tight and in good condition. This is for the protection of employes, and for the proper operation of over-current protective devices.

8) Set up a regular schedule for overhauling motors. Most motors should be overhauled annually, while those in severe use should be overhauled twice a year or oftener.

9) Dismantle the motor for a complete overhaul job. Wash all parts with carbon tetrachloride or some other safety solvent. Paint the windings with a good, oil-resisting insulating varnish.

10) Keep the area around the motor as clean as the motor. Arcing frequently ignites oily material that has not been cleaned up.

When fire breaks out in or around a motor, shut off the power before attacking the flames, if possible. Do not depend upon the circuit breaker operating or a fuse blowing out, but shut off the power. This will minimize damage to the motor and prevent continued arcing from re-igniting the fire. When the motor or conductors are dead, direct the fire extinguishing agent into the motor or upon whatever is burning, just as in any other fire. As soon as the fire is out, ventilate the area thoroughly to clear out smoke and fire gases.—*Safety Research Institute.*

Spray-painting assembled steel work for ships at a shipbuilding plant. Photograph courtesy of the Eclipse Air Brush Co.

Masonite Replaces Steel

IN STEP with the effort to conserve sheet steel, so vital to war needs, The Hays Corp., Michigan City, Ind., announces instrument and control panels made of Masonite reinformed with steel angles. The body of the panel is made of cross-grained Masonite ⅜-in. thick bolted to a framework of 3x3-in. angle steel. Braces 2x2-in. angle steel reinforce the center of the panel to insure adequate support for the instruments and controllers. The canopy and doors are of cross-grained Masonite 5/16-in. thick.

Masonite material is exceedingly hard and takes a finish comparable to steel. In order to match the finish standard for Hays steel panels, the entire Masonite panel is first gone over with a sanding surfacer, after which the priming coat is sprayed on and rubbed down to a smooth base. This is followed by coats of undercoater, sanded and rubbed. After a thorough drying, the finishing coat of black lacquer is sprayed on, giving a velvety finish that retains its beauty indefinitely. The inside is finished with two coats of gray lacquer. After the instruments and controllers are in place, it is practically impossible to distinguish Masonite panels from steel panels.

"FOR HIGH ACHIEVEMENT IN THE PRODUCTION OF WAR MATERIALS"

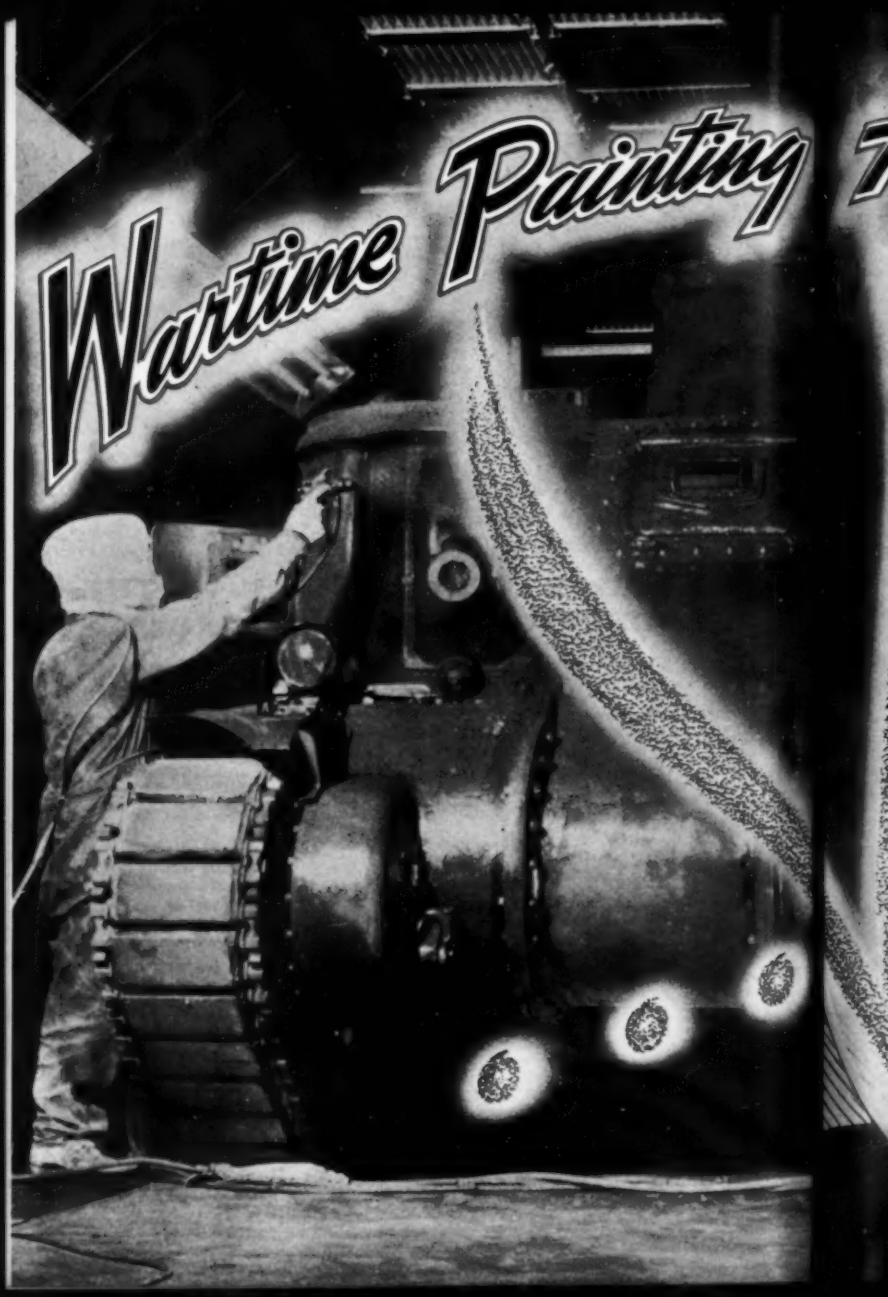
WE of Aluminum Industries, Inc., are proud of this new flag that flies over our four plants. But, we realize that before the job is finished even greater efforts are called for—and will be gladly given. Every man, every woman at Aluminum Industries is determined to keep the "E" Flag flying until complete victory is won.

At the same time, war production manufacturers can count upon us to continue to supply essential paints and finishes for product finishing, for interior and exterior use. The entire facilities of our new plant are concentrated upon supplying Permite Aluminum Paints on WPB allocation, and Permite Industrial Finishes formulated to U. S. Government specifications.

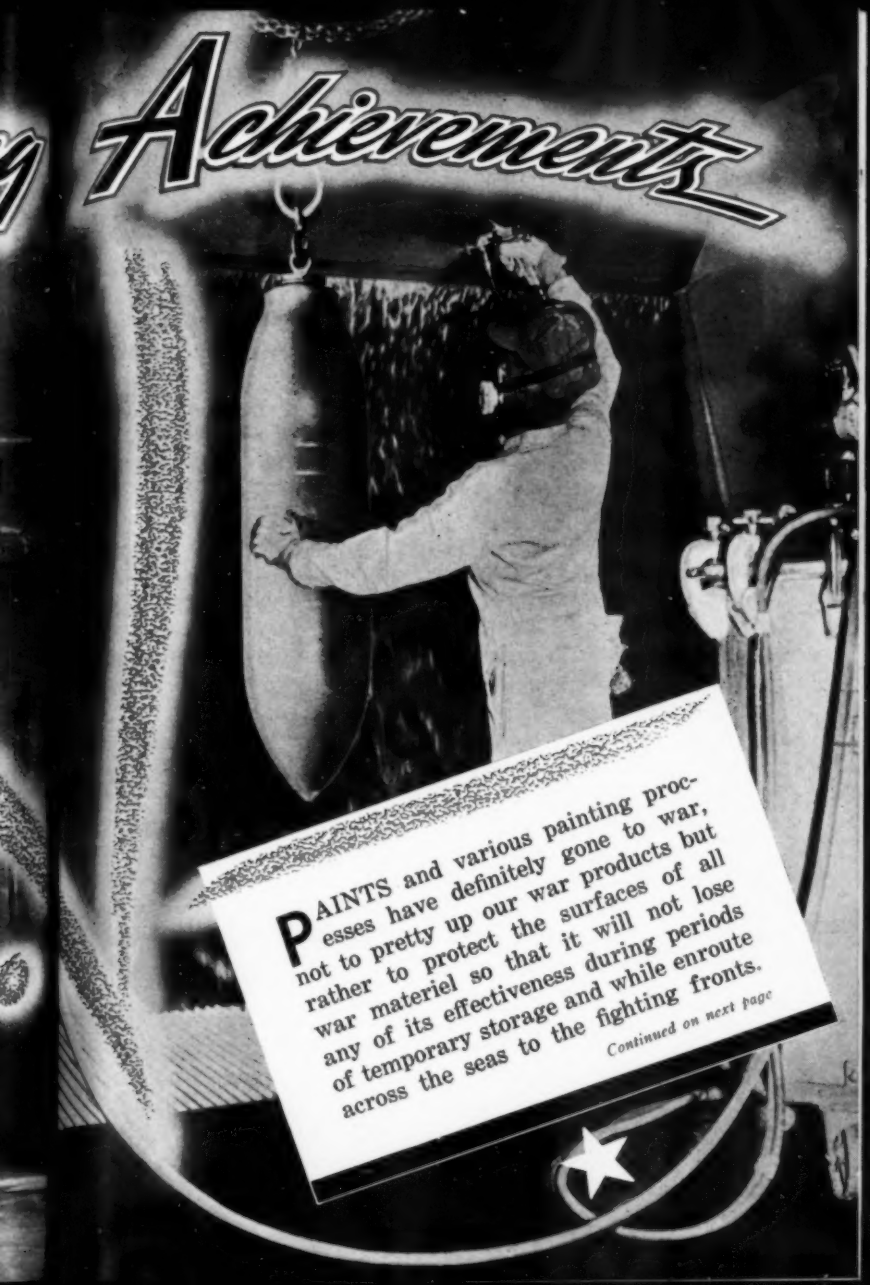
ALUMINUM INDUSTRIES, Inc.
Cincinnati, Ohio

Distributors in Principal Cities

PERMITE *Industrial* PAINTS


Wartime Painting T

Achievement



PAINTS and various painting processes have definitely gone to war, not to pretty up our war products but rather to protect the surfaces of all war materiel so that it will not lose any of its effectiveness during periods of temporary storage and while enroute across the seas to the fighting fronts.

Continued on next page

Protective coatings for the preservation of war materiel are tremendously important—but this is only part of the Wartime Painting Achievements story.

Camouflage represents a second important function of paints. With much of the observation, photography, signaling, shooting and bombing being directed from aircraft, it becomes imperative to do whatever is possible to conceal fighting men and fighting equipment. Areas on or in which fighting power moves or is concentrated—these need to be camouflaged in daytime and blacked out at night. Bright shiny surfaces and anything that contrasts in color, luster or reflectance with the natural surroundings of an area—these surfaces attract attention and often furnish welcome targets for the enemy.

A third use for paints and painting is identification. Color is relied upon to identify certain products that are used directly or indirectly in connection with the war effort. Color finds employment in the various stenciled markings, stripes, emblems and insignia. And, of course, luminous paints are in the picture during darkness and in blacked-out areas to serve in many ways, for instance, to make distinguishable the figures and pointers on important instruments and as close-up directional markings or silent warning signals.

Paint for military purposes has had to be endowed with many new characteristics to meet modern wartime requirements. This has imposed on paint research laboratories a tremendous responsibility. The insistent demands of our war production industries and the drastic restrictions imposed by war conditions have multiplied the research problems that had to be solved by manufacturers of industrial finishes. But the paint technicians have been equal to the demands made upon them. Their contributions to the war effort—those that can be told—make several inspiring stories.

Much of this research work has been directed toward improving government specifications in order to meet the special requirements of individual industries, eliminate bottlenecks, and help speed up production. In addition, an almost complete new line of ornamental and protective coatings, in which no critical materials are used, had to be developed for low-priority applications.

This review contains only a few of the countless paints and coating materials developed and offered by manufacturers of finishing materials. A large number of companies were invited to submit brief descriptions of some of their new materials for this editorial feature. Collectively, those who responded have listed a variety of materials for both military and civilian uses. Others advised that they are in position to furnish specification finishes for practically all kinds of war products, plus a number of non-critical materials for civilian use.

Obviously, if all companies had sent in complete descriptions of all of their recently developed and improved or changed finishes, the data would have made a book several inches thick. For instance, one concern sent in (but didn't expect published) nearly 50 bulletins, each of which includes from one to six pages. That stack alone is about ¾-in. thick. Inquiries for materials or concerns not mentioned in this issue can be directed to INDUSTRIAL FINISHING *Magazine*—and they will be given prompt attention.

METAL FINISHES

THIS classification includes olive drab lusterless enamels, wrinkle finishes and various other coatings for metal products employed directly or indirectly in the war effort. Some are designed for air drying, others for baking.

Flat Finishes—A series of clear and color-flat finishes specifically formulated to meet the new requirements imposed by Government specifications; for application by roller coating or spraying; minimum light reflection. Samples available.—Watson-Standard.

Fine Gloss Rip-pl Black and Fine Dull Rip-pl Black—These new Rip-pls are synthetic products that give uniform fine-line effect; they produce flexible and wear-resisting coatings which have good outdoor durability and resistance to water, gasoline and salt-spray. They are non-skinning. Spray full body. If necessary the parts may be placed in the oven immediately after they are coated. Bake at any of the following schedules: 250° F. for 45 to 60 minutes; 300° F. for 30 minutes; 350° F. for 20 minutes. Under infra-red lamps bake at a temperature of 325° F. for 20 minutes.—Hilo Varnish Corp.

Acid-Proof Black Paint—This product matches not only Army Specifications 3-106-D and 3-106-E, but also Navy Projectile Cavity Paint Specification OS-1210. Its extremely rapid drying properties and excellent coverage are two outstanding characterictics. Interiors of shells coated with Guardsman Acid-Proof Black are dry in 3 to 5 minutes, permitting the shell to be placed on the exterior coating spindle for the color coat. The ex-

Note: Photographs on pages 54 and 55, courtesy of O. W. I. and The DeVilbiss Co.

tremely high coverage of this material enables shell manufacturers to obtain 1,000 105-mm. interiors per gallon. Acid-Proof Black is successfully being used to coat shell bundle ends which require a 200-hour test in a 20% salt-spray solution.—Grand Rapids Varnish Corp.

Baflex-A—This new finish clings to steel, brass, aluminum, cadmium, terneplate, stainless steel, zinc, and even polished chromium. It can be used interchangeably as a primer for these hard-to-finish metals, or as a 1-coat finish in itself. Outstanding features include the following:

1) Sprays, dips, tumbles, or roller coats.
2) Air dries to recoat in ten minutes.
3) Permits a bake of 350° F., if desired.
4) Provides a perfect bond with lacquers or synthetics.
5) Flexible enough to permit fabrication.
6) Has excellent resistance to aviation gasoline, benzol, salt spray, humidity, water immersion, outdoor exposure.
7) Made in clear and black.

The adhesion insured by Baflex-A makes it invaluable to war contractors to whom it is available on priority. It has helped manufacturers of aircraft parts, radio apparatus, and electrical equipment to eliminate rejects due to poor adhesion.—Roxalin Flexible Finishes.

Phosphate, Oxide and Immersion Coatings—World War No. 1 saw the introduction and constant expansion of phosphate coatings on ferrous metals to resist rust and increase adhesion of supplemental coatings such as oils, paints and lacquers.

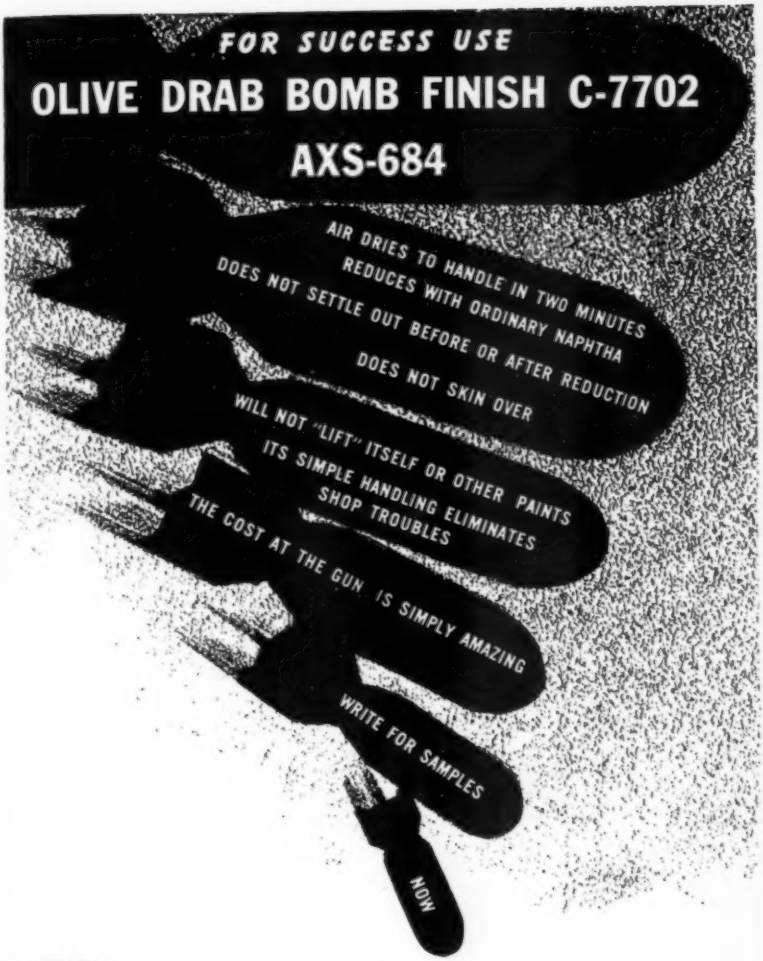
World War No. 2 is now witnessing the introduction and expansion in the use of oxide coatings. While the production of oxide coatings was attempted even as far back as World War No. 1, it is the pioneering work of Alrose Chemical Co. since 1932 that has brought this finish to the fore. The present tremendous production in small arms for our own armed forces, as well as for Lease-Lend, has been helped considerably by this process of producing oxide coatings which give a dull black non-reflecting surface on armaments in 10 to 30 minutes. Advances have been made in the past year in the production of oxide coatings which are more resistant to corrosion and abrasion.

As with phosphate coatings, the supplemental coating for oxide finishes is important. A great deal of advance has been made in the past year in producing oils and wax finishes, some of which will stand as much as 300 hours salt spray test.

The demand for black finishes for other metals has resulted in the development of the Oxidine finishes, which produce blacks on cast iron, zinc, copper, and brass. Oxidine Z, for instance, was developed to produce an adherent black on zinc in one to two minutes' time. Substitution of these black finishes for critical metals, which are normally available for plating purposes, has been of tremendous value to industry.

Other developments of 1942 include alkali-immersion copper and cadmium deposits on steel, as well as a combination copper tin immersion bath which is finding important uses and is resulting in a great saving of these critical materials. Bon White produces, by immersion, a tin coating in one to two minutes. It has eliminated, in many instances, hot tinning with a large saving in tin. A deposit of 5 to 50 millions of an inch is obtained, which is suitable as a pretinning for soldering, for lubrication of tight moving surfaces, and corrosion proofing of pipes and valves, and for identification of screws, rivets, and other small articles.—Alrose Chemical Co.

For munitions work where aluminum parts, cadmium-plated steel or brass have been formerly used and are now forbidden, a replacement finish composed of a black iron oxide chemical coating, followed by a rust-inhibitive lacquer, has been found suitable.—S. P. Wilson, Ph.D.


FOR SUCCESS USE
OLIVE DRAB BOMB FINISH C-7702
AXS-684
AIR DRIES TO HANDLE IN TWO MINUTES
REDUCES WITH ORDINARY NAPHTHA
DOES NOT SETTLE OUT BEFORE OR AFTER REDUCTION
DOES NOT SKIN OVER
WILL NOT "LIFT" ITSELF OR OTHER PAINTS
ITS SIMPLE HANDLING ELIMINATES
SHOP TROUBLES
THE COST AT THE GUN IS SIMPLY AMAZING
WRITE FOR SAMPLES
NOW

GENERAL INDUSTRIAL FINISHES

DIVISION • GENERAL PRINTING INK CORPORATION

PROTECTIVE COATINGS

100 SIXTH AVENUE • NEW YORK • N Y

"KNOW-HOW"

IS A WAR WEAPON, TOO

DU PONT War Service Men are eager to help you with your wartime finishing problems. You can consider them your "reserve forces" who stand ready to help you make the most of all your facilities in the battle of production.

Maybe you're on the defensive. Trouble in the finishing system threatens a "break through" in your production. Call up your reserves from Du Pont!

Or, better yet, you're on the *offensive.* You see an opportunity to take the initiative and *increase* output. Call up your reserves from Du Pont!

This is good strategy in war (as in peace). The Du Pont War Service Men are armed with the "know-how"—the deep, thorough knowledge of finishing processes—gained only through long years of fighting for greater speed, economy and service in every type of industry.

They have a strong base of operations in their complete laboratory facilities for developing, making and applying better finishes.

They're first-class fighting men—research chemists, laboratory tech-

DU PONT

REG. U. S. PAT. OFF.

SOME WARTIME FINISHING PROBLEMS

nicians, production men, service engineers and field representatives.

The Du Pont War Service Men are part of the great American industrial team which will continue to produce all the planes, tanks and other tools of war which our fighting men need.

Consider them the *reserve force* for *your* finishing operations.

WRITE OR WIRE THE DU PONT WAR SERVICE MEN OR MAIL THIS COUPON!

E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington, Delaware

---

SEND TODAY FOR DU PONT HELP . . . FREE INFORMATION AND SERVICE!

☐ *How to speed output and save materials*

Handy pocket-size, fully illustrated booklet, *"Hints on Wartime Finishing Economies."* Shows you 11 points to check for greater efficiency and speed on your war contract finishing schedules.

☐ *How to meet emergencies and solve problems*

Check here for the help of Du Pont War Service Men—skilled "trouble shooters" to straighten out "kinks" in your finishing system *before* or *after* the trouble occurs. Their "know-how" is at your disposal on any war contract finishing. Write about your trouble. Or wire in case of emergency.

☐ *Bulletins on Government Specifications*

A bulletin for each branch of the armed forces. Color chips. Application details. Drying time, etc. Helps you set up production schedules. Write here the government contract items to be finished.

SEND THIS COUPON TO:

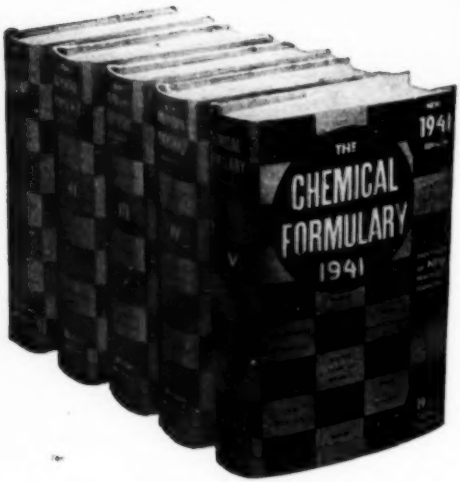
E. I. du Pont de Nemours & Co. (Inc.)
7146-J, Du Pont Building
Wilmington, Delaware

NAME_____

FIRM_____

ADDRESS_____

(This coupon good only in the U.S.A.)



CHEMICAL FORMULARY

5 VOLUMES — $6.00 EACH

Compiled by a staff of experts

Editor-in-Chief
H. BENNETT, (F. A. I. C.)

OVER 700 PAGES—$6.00

Thousands of latest Tested Formulae From Every Important Industry.

NEW PRODUCTS
NEW METHODS
NEW MATERIALS

A condensed collection of new, valuable, timely, modern, practical formulae for making thousands of products in all fields of industry.

From the entire literature of chemistry, expert chemists in each field have selected the best and most practical formulas. Complete in every detail this great reference furnishes not only the names and qualities of each ingredient, but it explains fully the steps to follow in the production of the finished material. It gives thousands of details about methods of working and manner of use that are of the utmost value in the preparation of every commercial or technical product.

There is no duplication of formulae between volumes and each volume is complete in itself. No two formulae in any volume are the same. In addition, there is a complete index in volume III for the first three volumes.

PARTIAL LIST OF CONTENTS:—Deodorants — Dis-infectants — Laundry Specialties — Dental Products — Etching — Fireproofing — Animal Remedies — Boiler Compounds — Glass — Textiles — Fibres — Beverages — Flavors — Rustproofing — Metal Treatment — Food Products — Enamels — Cosmetics — Inks — Marking Compositions — Soaps — Cleansers — Waterproofing — Metals — Alloys — Pastes — Glues — Fire Works — Waxes — Mildew Proofing — Rubber and Latex — Chemical Specialties — Adhesives — Polishes — Lubricants — Drugs — Farm and Garden — Specialties — Cement and Concrete — Resins — Synthetic Resins — Plating — Pyrotechnics — Solders — Welding — Pharmaceuticals — Insecticides — Oils and Fats — Liquors — Dyeing and Coloring — Fluxes — Explosives — Paints — Lacquers — Varnishes — Leather — Skins — Furs — Automobile Specialties — Removing Stains — Bleaches — Ceramics.

Vol. I.	— 1933 604 pages	$6.00
Vol. II.	— 1934 570 pages	6.00
Vol. III.	— 1936 566 pages	6.00
Vol. IV.	— 1939 638 pages	6.00
Vol. V.	— 1941 676 pages	6.00

Volume VI—Now in Preparation

SENT C. O. D. PLUS CHARGES **PRICE ONLY $6.00**

If check accompanies order, charges will be prepaid to any point in U. S. A.

INDUSTRIAL FINISHING *Magazine*

1142 North Meridian Street **Indianapolis, Ind.**

Vital metals used in war products must be protected from those silent but dangerous saboteurs, corrosion and rust. Such protection is provided by specification paints for an ever increasing number of products used by our Army, Navy, and Air Forces. Finishes are used on life rafts, cartridge and powder storage tanks, air corps repair docks, shell boxes, gas mask parts, heater and air-conditioning units, heavy-duty air-corps jacks, tanks, bicycles, and countless other articles and machines.—S. C. Johnson & Son, Inc.

Heat-Resisting Black Enamel—Manufactured to meet Army Air Forces Specification 3-135; designed for use on aircraft engines and parts subjected to high temperatures. This material requiring a 25% reduction for spray application, air drys in 8 hours or can be baked one hour at 275° F. One of the outstanding characteristics of this Guardsman enamel is the elimination of crimping tendencies. Aircraft engine manufacturers report excellent production with this enamel.—Grand Rapids Varnish Corp.

Ammunition Lacquers, PXS 979—Thoroughly tested, complete with government specifications; now in production use on ammunition.—United Lacquer Mfg. Co.

ES-680 Military Transport Finishes—We have developed the production of Class 101 oxide rust resistant primer and Class 204 lusterless olive drab finish coat to a high point. Both products are on the Holabird Q. M. Depot approved list, and have been supplied in large quantities to manufacturers of transport equipment and armament.—O'Brien Varnish Co.

Bake Finish for JQD 144—Working in connection with Jeffersonville Quartermaster Depot and individual manufacturers, our laboratory has released a finishing system to meet the requirements of Specification JQD 144. The method recommended eliminates parkerizing and consists of one dip coat of Lionoil Baking Chromate Primer and two dip coat Dull Black Baking Type I. Each coat is baked six minutes at 500° F. Other methods of application are also suitable. The finishing system developed meets all of the requirements of the specification, including 200 hours salt spray on panels with sharp edges.—Berry Bros.

Tumble Finish for Metal Buttons—A 1-coat tumbling finish which passed the army test for abrasion, and a boiling solvent test which involved 20 minutes contact with a boiling solvent solution consisting of half acetone and half benzol. Developed for a manufacturer of metal buttons.—Berry Bros.

Flobake Y520—Meets government specifications; specially formulated for army and navy hospital equipment. Resists acids, alkalies and all other rough usage.—United Lacquer Mfg. Co.

Pentrate Process—A patented process that applies a protective, penetrating finish to steel. Rich, deep black in appearance, the Pentrate finish is obtained at low temperatures through chemical action brought about by the ability of steel surfaces to react favorably to the laboratory controlled Phytanium-blended Pentrate formula. The resultant attractive finish shares its popularity equally with substantial durability, rust resistance, and friction-reducing qualities imparted during the same simple and economical operation.

This process is one of immersion in two low-temperature solutions that are composed of Pentrate material and water. The solution in the first Pentrate tank boils at approximately 285°

In high production coating of small parts, such as shell cases, keep a close check on the cleaning operation. An ounce of prevention in the cleaning will prevent pounds of trouble at the final inspection bench. A recent lacquer complaint on adhesion was traced to the misfunctioning of a pump in the automatic cleaning machine, which was poluting the final rinse.—W. T. Smith.

F. and the second at 310° F. The same material is used in both tanks. Parts to be treated are first thoroughly cleaned and then immersed in the first tank for the required length of time, then transferred directly into the second tank for an equal period. There is no rinse between these two solutions. After this treatment the work is rinsed in cold running water and, if desired, either dipped in oil as required for the particular application at hand, or painted, lacquered or enameled.

Pentrate equipment can be fitted quickly and economically into a production line and is readily adaptable to hoists, conveyors or continuous handling. The work can be handled in baskets or on suitable fixtures.

The concentration and boiling point of the Pentrate solutions can be automatically controlled, thus eliminating the necessity of skilled labor.

Pentrate is packed in convenient molded cakes for ease in handling. Pentrate solutions do not deteriorate or weaken with continued use and require no energizer. The only replacements needed are those to compensate for the unavoidable mechanical carry-over or drag-out of the work. Pentrate is non-poisonous, non-toxic, and does not give off objectionable fumes.—Heatbath Corp.

METAL PRIMERS

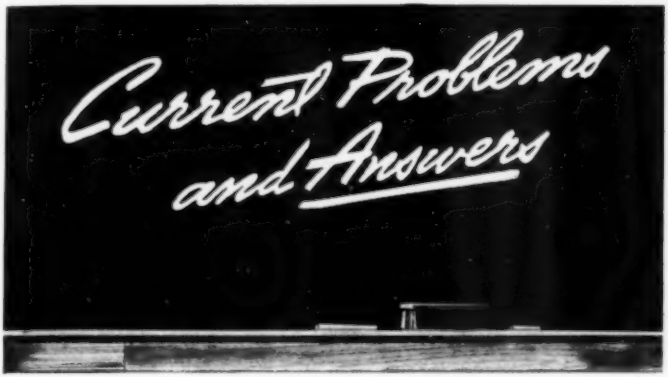
PRIMERS for metals are tremendously essential because they serve as the base upon which one or more other important coatings are applied. They must adhere perfectly to the bare metal under a variety of severe conditions such as heat and cold, dryness and moisture, expansion and contraction, bending and shock. They must resist corrosion and rust. Practically all companies that manufacture metal finishes have metal primers of various types in their line.

Zinc Chromate Primer AN-TT-P-656—A rust-inhibiting primer for bare metal. Ronan's zinc chromate primer more than meets Government Specification AN-TT-P-656. Our chemists have overcome drawbacks ordinarily met in this widely used primer—namely, slow, uneven drying, and curdling when thinned. It dries fast and uniformly; provides maximum adhesion and rust-inhibiting properties; may be sprayed, dipped or brushed; thins with AN-T-8 toluene substitute thinner without curdling. Excellent for government or industrial equipment.—T. J. Ronan Co.

Zinc Chromate Primer AN-TT-P-656—We have developed this product thoroughly. It is on the approved list and has sold in large quantities during the past year.—O'Brien Varnish Co.

Ocean Gray Primers—To various manufacturers we supply 52-P-18 Zinc Chromate, No. 84 Zinc Chromate Primer 5U Ocean Gray and Haze, and have also developed an infra-bake Ocean Gray for one manufacturer.—Berry Bros.

ES 680A (Lusterless Olive Drab HOMB Class 204)—Passed and approved to meet government specifications; now in production use on war



Problem No. 2 to See or not to See?

Last word from Washington: New Government specifications call for a *flat finish* with a minimum of light reflection. Your problem is to meet these specifications with the production facilities available to you.

Here Is the Answer

We are already in production on a series of clear flat finishes specifically formulated to meet the new requirements by the roller-coating or spray method. Samples will be shipped immediately on request. Our laboratory is at your service in checking results and straightening out any difficulties which may arise. *The new finish is available in clear flat and colors.*

THE WATSON-STANDARD CO.
Manufacturers of
PAINTS . . . VARNISHES . . . INDUSTRIAL FINISHES AND LITHOGRAPH COATINGS

TOUCH JOB HEADQUARTERS
℞ Prescription Finishes
Give us your metal coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

FACTORY AND GENERAL OFFICES: PITTSBURGH, PA.
WAREHOUSES: BOSTON · BUFFALO · DETROIT · NEW YORK

Zinc yellow primer is important. It is the ideal first coat on the now vastly employed aluminum alloy metals. In some respects also zinc chromate possesses certain advantages over the old stand-by red lead undercoating steel. When production takes advantage of the time-saving obtainable with quick-drying synthetic resin varnishes, the yellow rather than the red undercoat is one again in order. Use of red lead is ruled out if a welder's torch is to enter the scene, for poisonous vapors are released under intense heat.—Du Pont Co.

products; (Rust-inhibiting primer, Class 101) a perfect bond on all kinds of metals; is extremely tough and provides a perfect base. (Gray refinishing primer, Class 102) specially formulated primer for refinishing work. Meets unusual conditions and provides an excellent base for any material.—United Lacquer Mfg. Co.

Rust-Inhibitive Primer—Meets Specification ES-680, Class I, Rust-Inhibitive Primer. Used as primer on metal surfaces of trucks, trailers, gun mounts, etc. Reduce two parts primer to one part naphtha for spraying or dipping. Recoat after an overnight dry.—Reliance Varnish Co.

One-coat Spray Gray Primer—Developed for a manufacturer of galvanized metal life boats. Reduces with VMP naphtha; dries quickly; has exceptional filling properties so as to obscure the flower of the metal and which did not blister when test panels were immersed in water for a month. —Berry Bros.

CAMOUFLAGE COATINGS

MATERIALS in this classification include both paints and flocks. Their colors will depend upon the natural color of the area in which they are to be used, and their reflectance must also match that of the natural surroundings in such areas—for instance, green foliage, autumn foliage, desert sand, water, etc.

Synthetic-type Camouflage Airplane Finish—Formulated after much experimental work, supplemented by exposure tests in different climates. An alkyd type not unlike the smooth coat on your "Duluxed" refrigerator, but dark and dull, to meet requirements of U. S. Army and Navy Air Corps.

This finish has the added quality of withstanding the destructive action of de-icing fluids. This is indeed worthwhile. Previously, the liquids spread on plane wings to inhibit the dangerous, speed-reducing formation of ice raised havoc with lacquer finishes. This rapid deterioration required frequent grounding for laborious touch-up and re-painting to protect the metal. Ice in winter or at top altitudes no longer sets aircraft on the ground for ill-spared hours of repair finishing.—Du Pont Co.

Navy Blue Crate Paint E-111 and E-115. Also TT-V-121, Spar Varnish No. V-587—Navy blue crate paints are being used on Navy crates where no definite specifications are required. The spar varnish will pass all the required tests.—The Lawrence-McFadden Co.

"Infray" (Infra-Red Reflecting Paint)—A new type of low-visibility paint, possessing exceptional heat deflecting qualities—for use in the protective concealment of vital defense structures and equipment.

Already in use on certain Government properties, the new paint meets tentative Navy specifications for infra-red reflecting paints for use on fuel storage tanks, buildings, and certain

ONE STEP AHEAD OF THE PARADE

American ingenuity in meeting every emergency, quickly and definitely, is reflected in the complete line of Walker finishes.

Beginning in our laboratory, where finishes for the military are carefully formulated and tested, on through each manufacturing operation, Walker finishes gain certain characteristics that make them stand out ahead of the parade.

Users of finishes for wartime painting will understand what we mean, after testing Walker materials. Working samples may be had on request. State specifically the type of material or materials required, and for what purpose.

PRIMERS SURFACERS LACQUERS
SYNTHETICS WRINKLES

H. V. WALKER CO.
Elizabeth, New Jersey
MODERN PRODUCTION FINISHES

Complete paint jobs of low visibility gray and sea blue are furnishing visual concealment for mine-layers busy at their wartime tasks in our harbors and coastal areas, and for scores of American oil tankers plying waters infested with lurking subs.—The Arco Co.

types of equipment where dark colors as well as heat-reflecting qualities are required.

It has just been offered commercially under the trade name of "Infray" and is being manufactured in green, tan, black and four intermediate shades which, when properly selected, will meet the requirements of good camouflage in any sort of terrain. All seven shades are hard to see from the air, and throw off most of the heat of the sun's rays that would normally be absorbed.

The unusual degree of heat deflection which can be obtained with the darker colors in these paints promises to be of particular value to public utilities, oil producers and refineries, and to anyone who has to store large quantities of volatile materials in tankage above ground. This fact, combined with the low-visibility, should go a long way toward meeting the need for protection of fuel supplies, other stores and many types of building.

When you realize that an approaching bomber has to sight his target at a distance of about 12 miles, the importance of any low-visibility paints which approach the qualities of aluminum paint in their heat deflection can be readily understood.—The Arco Co.

Flock for Camouflage—One of the main purposes of camouflage is to break up the effect of regular coated surfaces, so that they blend in with adjoining areas and furnish a uniform appearance.

Due to its nature, rayon and cotton flock, which can be obtained in fast dyestuffs, and can be easily anchored to any surface with suitable adhesives, furnish wonderful possibilities for camouflage finishes.

Work on finishes has been done along this line in recent months, and Rayon Processing Co. of R. I. offers their confidential technical assistance to any concern doing work on this possibility.

Other flock consumers have found that rayon and cotton flock furnish an ideal finish for novelties going to Post Exchanges, as well as substitute finishes on many items requiring friction base, etc.

3-106-E Seal-Brown and Dark S. B. Acid-Resisting Finish No. 16957—These materials are used on Army cartridge crate cases and may be reduced from two to three parts with VMP naphtha to one part of the finish.—The Lawrence-McFadden Co.

Cotton and Rayon Flocks—For assistance in the war effort we have colored and submitted to scientists for testing, under aerial photography, the standard camouflage colors adopted by the Army officials. These show great promise in standing up under infra-red rays. These flocks are made in various lengths and several different fiber diameters to fit special conditions.

The flocks we are concentrating on consist mainly of cotton and rayon, dyed so as to give the highest possible resistance to exposure to weather and sunlight. To accomplish this, we utilize the services of a complete staff in our dyeing department, where all the necessary equipment is available and also the technical skill covering the field of textile chemistry that is necessary.

Further, we are making substantial quantities of flock for use in the plastics industry, as a filler where strength is essential. Our products are a part of the finished molded pieces used in many weapons both in the Navy and aircraft industry. These cotton flocks, for use in plastics, range all the way from very fine to coarse-cut materials which, at all times are kept uniform to assure proper results.—Claremont Waste Mfg. Co.

GOVERNMENT SPECIFICATIONS ARE EXACTING!

Reliance dependability in the development of finishes to meet governmental specifications is based upon wide experience. We are supplying aircraft finishes—direct to the Army and Navy in addition to a wide variety of finishes for many types of ordnance. Send us your problem—we can help you too! Here are several typical classifications for which Reliance products have been tested and approved.

OQMG No. 63-B Quartermaster Corps Bunk Beds

We are supplying materials to pass the severe tests in this specification. Hundreds of thousands of our armed forces will sleep on beds finished with Reliance products.

ES-680 Quartermaster Corps Truck Finishes

Whether it is Class 38 Clear Wood Lacquer, Class 2 Refinishing Primer, Class 1 Rust-Inhibiting Primer, or Class 4 Lusterless Olive Drab Enamel that you need, we can supply tested and approved products.

Navy and Air Corps Lockers, Desks and Filing Cabinets

Large quantities of wooden articles of all kinds are being finished with Reliance products that have been engineered to meet the needs of individual specifications for each item.

Make Sure With **RELIANCE FINISHES**

Samples will be sent gladly on request.

RELIANCE VARNISH CO., INC., LOUISVILLE, KY.

Giant FINISHING DEPT. FOR GIANT BOMBERS

DESIGNING and installing spray painting equipment to do a specific job has been the business of the Binks Manufacturing Company for nearly half a century. The installation shown here was made recently by Binks in a mammoth new war plant. The giant three-deck water wash spray booths, spray painting equipment and accessories were designed by Binks engineers to keep finishing abreast of increased production . . . to provide healthful working conditions.

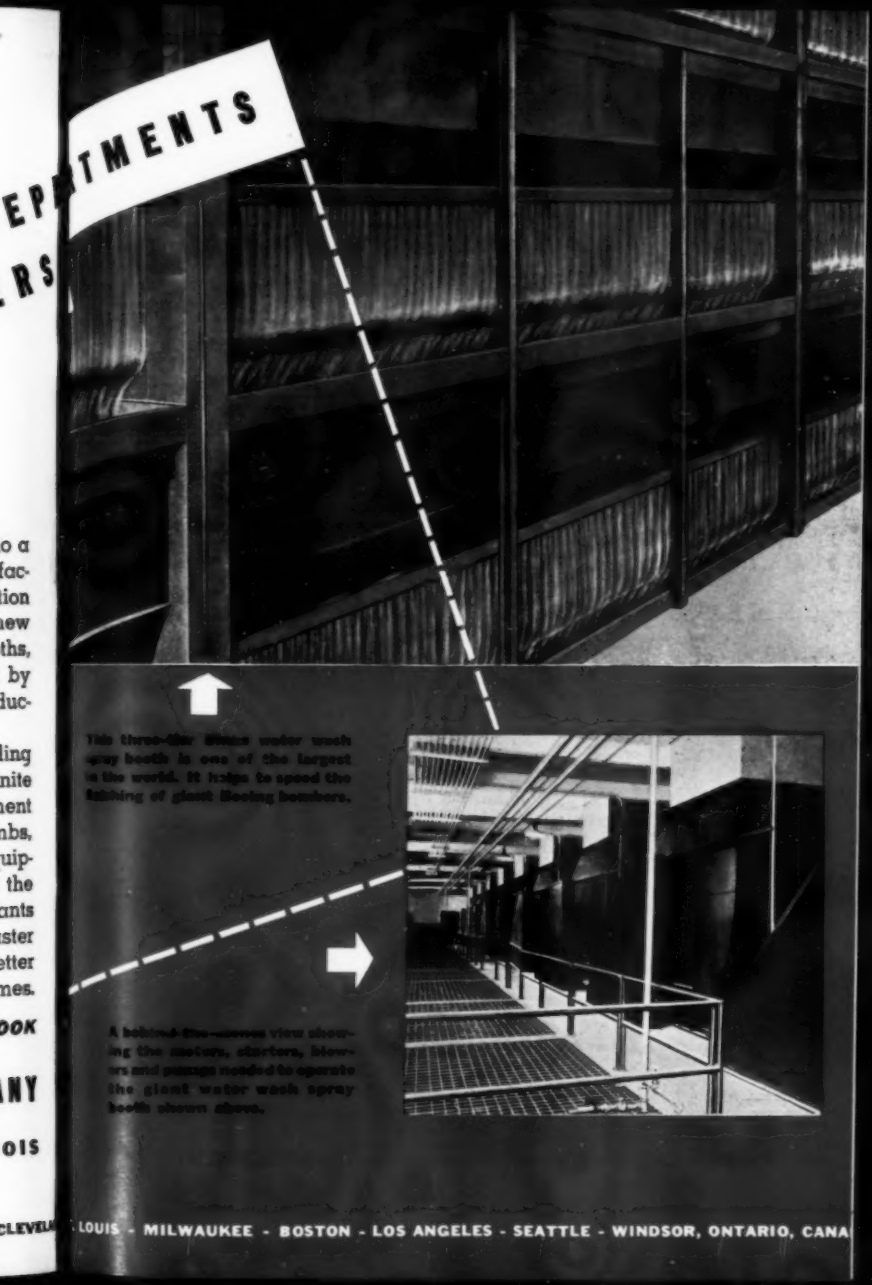
Binks wide peacetime experience in designing and installing tailor-made spray painting equipment has been of infinite value to companies in engineering the special equipment needed to speed up the finishing of planes, ships, bombs, shells, tanks, guns, torpedoes and other war equipment. The giant installation illustrated here and the hundreds of Binks installations in other war plants throughout the country, not only guarantee faster war production now . . . but point the way for better spray painting methods for all when peace comes.

SEND TODAY FOR A BINKS CATALOG-DATA BOOK

BINKS MANUFACTURING COMPANY

3114-40 CARROLL AVENUE - CHICAGO, ILLINOIS

NEW YORK - DETROIT - SAN FRANCISCO - PHILADELPHIA - PITTSBURGH - CLEVELA



This three-tier Binks water wash spray booth is one of the largest in the world. It helps to speed the finishing of giant Boeing bombers.

A behind-the-scenes view showing the motors, starters, blowers and passages needed to operate the giant water wash spray booth shown above.

LOUIS - MILWAUKEE - BOSTON - LOS ANGELES - SEATTLE - WINDSOR, ONTARIO, CANA

BOMBS for VICTORY

Finished with

EGYPTIAN Lacquer Enamel

for Ammunition

(Cellulose Type)

***Meets U. S. Gov't Spec. PXS-979**

For use as an exterior coating for bombs, shells, grenades and other ammunition components. An important new development which—

Complies with Amendment 2, dated June 23, 1942.

Dries *rapidly* at room temperature, since it is a lacquer type.

Covers clean metal *completely* in one spray coat.

Can be dipped as well as sprayed

Comes in sheen range from eggshell to flat.

Comes in wide variety of colors conforming to Color Card Supplement to Specification No. 3-1, General Specifications for Paints and Related Materials. Also Supplied in Black.

Provides in Blue Gray No. 12 a covering which meets Salt Spray requirements of Specification PXS-655.

Meets PXS-979 Specification requirements as to ability to withstand heat, cold water, flexibility test, blush resistance. Is non-lifting.

Send for Government "Spec." Book 1F

These are a few of the more important Government "Spec." finishes which we can furnish.

EX-666
Synthetic Type
Protective Coating
JQD-144
Lustreless
Black Baking Enamel
AXS-736
Clear Finish
for Steel Cartridge Cases
AXS-680
Lustreless Lacquer Enamel
for Ammunition
AXS-684
Type I and II
Lustreless Paint
for Ammunition
3-142-A
Nitrocellulose Lacquer Enamel
for Ammunition
P-21-S-2
Zinc Chromate Primer
84
Zinc Chromate Primer
AN-TT-P-656
Zinc Chromate Primer
PXS-979
★ Lacquer Enamel
for Ammunition

THE EGYPTIAN LACQUER MANUFACTURING CO.

ROCKEFELLER CENTER—NEW YORK, N. Y.

EGYPTIAN
Superior FINISHES

Other technical advances include the development of cold-crack-resistant putties to improve aerodynamic efficiency of wings by reducing the drag caused by seams and depressions; a rust-inhibitive green primer for steel seaplane runways; cooperative research for and production of a protective system for the interior of the cooling system of a well-known aircraft engine, to give at least equivalent results to those obtained from a captured German Messerschmidt pioneering the use of dip tank sealers for plywood, leading to the establishment of a number of these time-saving tanks in aircraft factories.—Du Pont Co.

AIRCRAFT PLYWOOD FINISHES

PAINT technicians have given a great deal of attention to the development of suitable treatments and protective coatings for plywood, which is finding extensive use in military aircraft. Plywood's weakness is on the surface, so it can be truly said: "Save the Surface and you Save all."

Liquid Wood Sealer—Formulated in accordance with Army Air Forces Specification 14113. Intended for use as a sealing coat on wood used in airplanes and gliders. It can be sprayed, brushed or dipped with no reduction and drys to recoat in 2 hours. This sealer is being successfully used in production in large dip tanks and shows no tendency to body up on standing. —Grand Rapids Varnish Corp.

Lacquer Coat is Plastic Film—Our lacquer is a plasticized nitrocellulose and resin mixture, which would be readily recognized as a plastic in solid form, but it is commonly regarded merely as "another finish" when dissolved and dispensed in a mixture of organic solvents. These solvents, of course, are a convenience and a waste. They facilitate the application of these coatings and, having served their purpose, evaporate and are entirely dissipated in the atmosphere, leaving behind a plastic veneer, tough and adhesive, and possessing such special film characteristics as may be desired.—Forbes Varnish Co.

Aircraft Plywood Finishes—Complete finishing systems have been developed, and finished plywood has undergone severe tests, some of them extending over a period of several years. The systems are adapted to specific requirements, differing for each of the woods used—birch, mahogany, fir, popular, spruce. The development of both materials and finishing systems has been conducted in close co-operation with some of the leading aircraft manufacturers and the presently known requirements and specifications have been met.

The method of application can be varied to fit the production procedure and available equipment. The systems developed involve several operations, depending upon the nature of the wood used in fabricating the panels. A typical system might employ a clear sealer, a filler (on open-grained wood only), a pigmented sealer and finally a camouflage enamel.—Ault & Wiborg Corp.

Our contribution to the aircraft trade during the year has largely been in the development in the acetate butyrate dopes, but more so in the development of a complete scheme for finishing plywood gliders—not only the synthetic type of finish on plain wood, but also the complete scheme for fabric finishing over plywood.—Titanine, Inc.

MILITARY WOOD FINISHES

THIS classification includes protective, camouflage and identification coatings for military equipment made partly or entirely of wood, such as bunk beds, truck bodies, boxes, crates, etc.

Clear Sealer & Lusterless Olive Green—A highly water-repellent finish for paper-covered plywood board, even after the paper film has been marred. Developed for a manufacturer of boxes for the air corps, using a paper-covered plywood board. The clear sealer penetrates deeply and has special water-repellent properties.—Berry Bros.

Neutral Gray Primer Sealer, Spec. 63B—Meets Quartermaster Corps specification for first coat on wooden bunk beds. Reduce five parts primer to two or three parts naphtha for spraying. Dry four hours to overnight before sanding and recoating.—Reliance Varnish Co.

Quick-drying exterior white primer—For fir plywood and Masonite Tempered Presdwood. This product is produced for spraying on large surfaces in high-speed production. It has unusually solid hiding and will produce, in one coat, an opaque white surface so that one coat of ordinary house paint, applied on the site after the prefabricated house has been erected, will produce a perfect exterior paint surface. This material works equally well on either fir plywood or Masonite Tempered Presdwood. It is widely used by makers of prefabricated houses in two slightly different types, one which dries sufficiently hard (so that the panels may be handled) in 20 minutes, and another which dries sufficiently hard (so that the panels may be handled) in one hour.—O'Brien Varnish Co.

O. D. Gloss Enamel, Spec. 63B—Meets Quartermaster Corps specification for finish coat on wooden bunk beds. Reduce four or five parts of enamel to one part of naphtha for spraying. Dry overnight before packing for shipment.—Reliance Varnish Co.

Olive Green Glazing Putty, No. 8938—For glazing defects that show up after the Spec. 63B O. D. Gloss Enamel has been applied. (Use same as Neutral Gray Glazing Putty, No. 8511).—Reliance Varnish Co.

Neutral Gray Glazing Putty, No. 8511—For glazing defects that show up after the Spec. 63B Neutral Gray Primer Sealer has been applied. Should be applied full body with a glazing knife and will dry in 5 to 10 minutes, to be sanded and recoated. As soon as the can is opened the first time,

---

Conditions in the paint industry or at least in our factory have been such that most of our development work has been along the line of formulating to meet specifications and to eliminate the use of critical materials. Consequently we have nothing which can truly be called a new development. Along with nearly everyone else in the industry, we are supplying materials under specification ES-680a, as well as finishes for army beds, wood filing cabinets, wood lockers, storage batteries, shells, etc.

The finish which comes nearest to being a new development is our finishing system for wood office equipment to simulate the finish on steel equipment of the same type. By the use of our TL-4057 olive drab undercoat and 79-634 olive drab lacquer enamel, a finish is obtained in two coats which, after wiping off with wax, makes wood cabinets identical in appearance with steel ones.—The Gilbert Spruance Co.

STREET lights on the West Coast's ocean-front drives can't be blacked out, for many of them light arterial highways. Yet they offered a constant threat to coast-wise shipping, silhouetting tankers for Jap pot-shots. The obvious answer was to paint the ocean side of the lamps. But ordinary dark paints absorb heat and thus cause the glass to expand unequally—and break. Arco Infray, however, safely and effectively masks the tell-tale gleams.

Infray—the infra-red reflecting camouflage paint—is but one of many examples of the ability of the Arco Research Laboratories to meet specific needs with specialized products, tailored to fit. That ability is at your disposal to help you find the solution to any problem paint can solve. Your inquiry will receive prompt action.

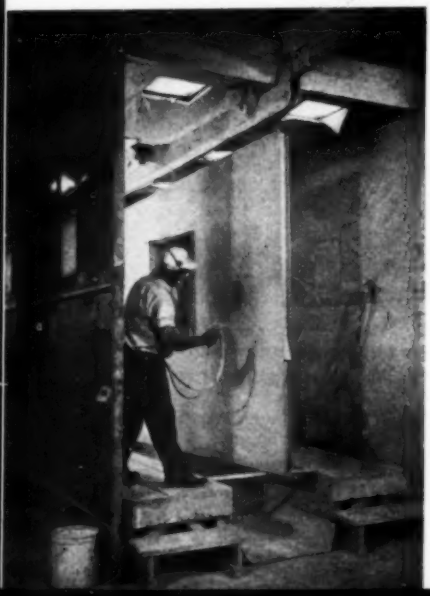
War Paints for Industry **THE ARCO COMPANY**
CLEVELAND, OHIO · LOS ANGELES, CALIFORNIA

The great portion of our research and development work this year has been on specification finishes and making each specification fit the individual production schedules. This has been difficult in many instances, but so far we have been fortunate in solving these problems.

We have developed very rapid drying enamel finishes for use in places where lacquer cannot be used and these have performed fine service.—Yarnall Paint Co.

a small amount of water should be put on top of the glazing putty to prevent it from hardening before the entire contents of the can have been used.—Reliance Varnish Co.

Prefabricated House Finish—A 2-coat system for putting a semi-luster clear finish on interior plywood panels. The products involved in this system consist, first, of a lacquer type sealer. This product dries so fast and so hard that it can be machine sanded in 20 minutes. It does such a good job of sealing that one coat of special synthetic semi-luster varnish, applied over the lacquer sealer, is absolutely dependable in producing a fine even-textured finish. The special synthetic semi-luster varnish used with the lacquer sealer is also extremely quick-drying, so that the panels can be handled without any delay on a production line. It produces a finish of great beauty and unusually good resistance to cleaning, washing and wear.—O'Brien Varnish Co.



Olive Green Filler, No. 8381—Reduce equal parts with naphtha, let flatten, and wipe off across grain of open-pore woods, like oak. Dry overnight. —Reliance Varnish Co.

Sealer, No. 165 — Spray full body over No. 8383 Olive Green Stain. Dry one hour. Sand. — Reliance Varnish Co.

Olive Green Stain, No. 8383—Reduce equal parts with naphtha and wipe off the same as a normal pigment-wiping stain. Use over bare wood on close-grained woods, or over No. 8381 Olive Green Filler on open-pore woods. Dry overnight.—Reliance Varnish Co.

Lusterless O. D. Enamel, No. 8932—Meets Specifications ES-680, Class IV. Lusterless Olive Drab Enamel. Used as top coat on trucks, trailers, gun mounts, etc. Reduce two or three parts enamel to one part naphtha for dipping or spraying. Dry overnight before packing for shipment.—Reliance Varnish Co.

We now supply a tremendous volume of finishes for the air services of our country and are prepared to supply materials to all specifications for war planes, for training planes and for gliders.—Berry Bros.

War Products are Not Nudists . . .
They Require Protective Coatings!

You'll find Rockford Finishes helpful in your high-speed war jobs. Ease of application and the durability of the finish serve two purposes . . . the saving of time and the ability to meet the most exacting protective requirements.

Rockford Finishes will serve your needs profitably and meet all U. S. Government specifications.

Your inquiry will receive our prompt attention.

NO TAMPERING WITH QUALITY

ROCKFORD VARNISH COMPANY

Manufacturers of Protective and Decorative Coatings

ROCKFORD, ILLINOIS

Shellac which has been universally used in the finishing of all types of wood work, including floors, bowling alleys and furniture, is no longer available for general civilian use. Shellac comes only from India. It is a critical material to the Government and all stocks are, therefore, being conserved for use in war materials only. William Zinsser & Co., one of the very oldest and largest manufacturers of shellac has developed a new shellac substitute, which has been put on the market within the past few years, and which is already being widely used by both industry and government.

Gray Primer, No. 8110—Meets Specification ES-680, Class II, Refinishing Primer. Used over No. 407 toxic penetrex on cargo truck bodies and various wooden parts. Reduce two or three parts of primer to one part of naphtha for dipping or spraying. Dry one hour before stacking, and overnight before recoating.—Reliance Varnish Co.

One-coat Shelf & Bin Finish—Vedoc 1-coat dipping lacquer in approved colors has found favor for use in protecting wood shelving, stock bins, etc., needed in defense plants. It imparts an even uniform appearance to all types of wood, and provides a rapid and economical means of applying a durable and mar-resistant coating.—Liquid Plastics Div., Ferro Enamel Corp.

O. D. Touch-Up Enamel, Spec. 63B—This is the same color as the Spec. 63B O. D. Gloss Enamel, but is made to dry hard in 2 to 2½ hours. It is used for touching up damaged spots after the bunk beds have been given a coat of Spec. 63B O. D. Gloss Enamel.—Reliance Varnish Co.

Toxic Penetrex, No. 407—Meets Specification ES-680, Class 38, Type I, Rot-Inhibitive Sealer for wood. Used on cargo truck bodies and various wooden parts. Reduce equal parts with naphtha for dipping. Dry one hour before recoating.—Reliance Varnish Co.

Plydur—A clear or pigmented finish for resin-bonded plywood, used in making airplanes and speed boats. It is extremely resistant to rain, snow, heat, cold and other atmospheric conditions, and can be either air-dried or force-dried.—Maas & Waldstein Co.

New Wood Sealer—Has been used with outstanding success as a shellac substitute in production finishing; a lacquer base product developed in the past year and used with unusual success by manufacturers of furniture as a shellac substitute for undercoating clear and pigmented finishes. It has remarkable sealing, drying, "build" and sanding properties.—O'Brien Varnish Co.

Noroy Smoothlac—Designed as a substitute for shellac. It provides for a satisfactory finish at a moderate price; is available in white and orange. —Rudd Lacquer Corp.

For prefabricated units of housing, of other forms of wall panel structures, we have worked out a method to allow rapid production finishing and processing, which would do away with the bottleneck caused by delays on usual finishing operations. It is practically a revolutionary method of eliminating considerable quantities of finishing labor and material. Our name for it is "Van-Mural art panel walls; predecorated (washable) wood panels."—L. R. van Allen Co.

APPROVED IN PRODUCTION

Specialists? Yes!

SPEED THE WAR EFFORT WITH APPROVED FINISHES

We have turned idle plants, caused by finishing troubles, into full production with approved and tested finishing materials, through research and practical experience. Let us produce a finish that meets Government Specifications PLUS, adapted to your present production methods. IT CAN BE DONE!

Developments We Are Proud of—ALL FIRSTS

No. 1080 Water Can Interior Coating developed for QM Spec. No. 111 — APPROVED IN PRODUCTION.

No. 60 Clear and Pigmented Water and Gasoline Can Coating developed for Marine, Navy, Army and Lend-Lease — APPROVED IN PRODUCTION.

No. 425 Black Enamel for Personal Hardware applied in production and approved by QM Laboratories — APPROVED IN PRODUCTION.

No. H 75 Sealing Seam Compounds for troublesome double seaming operations — APPROVED IN PRODUCTION.

No. 5-622-AXS-684 One Coat Dipping or Spraying on bomb fins and ammunition, etc. — APPROVED IN PRODUCTION.

AXS 736 Clear Shell Coating, dip or spray — AND MANY MORE TOO NUMEROUS TO MENTION.

GOVERNMENT SPECIFICATIONS IN PRODUCTION — Zinc Chromate Primers; Holabird, Maritime, Naval Ordnance, QM Corps, Marine Specifications.

We've Helped a Score of Concerns with Their War Production Finishing Problems. We Can Help You, Too! Write us.

THE SCHAEFER VARNISH COMPANY

Incorporated

LOUISVILLE — — KENTUCKY

MISCELLANEOUS FINISHES

INCLUDED in this miscellaneous list is a variety of coating materials most of which do not fit appropriately under any of the other classifications. Those that perhaps should be listed elsewhere were received too late to be so classified.

Noroy Shellac Blender—Formulated to double the mileage of pure shellac, while at the same time making it completely waterproof. Acceptable to manufacturers engaged in Government work, for this purpose.—Rudd Lacquer Corp.

Housing Trailer Finish—For a manufacturer of defense housing trailers using homosote (a paper board) we developed a gray synthetic surfacer reducing with VMP naphtha and a lusterless olive green finish coat. Both coats to be applied the same day.—Berry Bros.

Blanchit—Our wood bleach has been improved by working to a little closer tolerances against occasional difficult species or varieties of wood which have been offered for treatment. Further intensified results are obtained when in use by the furniture manufacturing industries.

Inasmuch as button makers, handle makers, toy makers, etc., are having their special era just now, in the absence of metals, it should be of great interest to them to know that a sure, prompt-acting bleach, appliable by dipping or tumbling, has been perfected.

Necessities of the war effort, requiring restriction on the use of many finishing and refinishing materials and manpower, has become a problem to individuals and firms who are considering the use of protective finishes on woodwork, store fixtures and other standard equipment. In this connection the Blanchit wood-bleach process is offered as a substitute for painting to give permanent results at a low cost of labor. After first use, retouching can be done on worn spots without showing the patches.

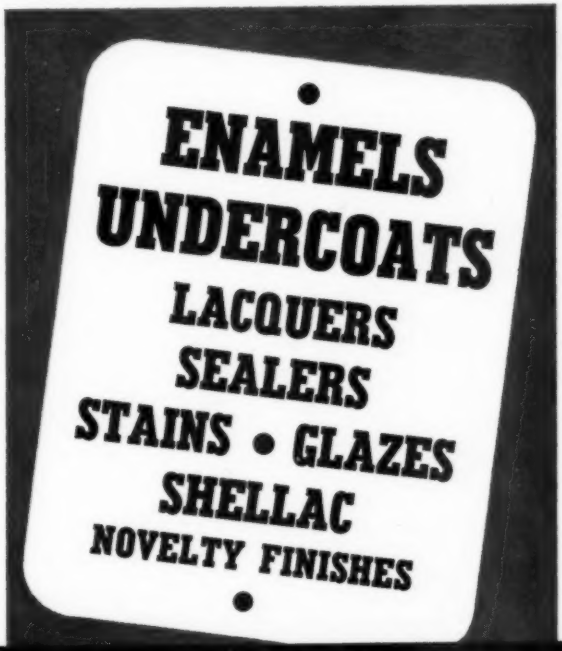
By using a wood finish of transparent materials over bleached wood, beautiful light-reflecting (therefore light-saving) surfaces are produced on wood trim, paneling, furniture, fixtures, etc. As there will be comparatively little wearing off of a transparent finish, and no chipping off of pigmented finish coats, the upkeep of wood paneling, woodwork, etc., will be low.—L. R. van Allen Co.

V-Metalustre—The ever-popular metallic-luster lacquers and enamels which were formerly made with aluminum powders, now unobtainable, have been replaced with the "V-Metalustre" line, which contains a non-metallic lustrous material.—Maas & Waldstein Co.

Seal Lac—Made to replace white shellac which comes from India and is under government restrictions. Seal Lac dries in three hours. Two coats can be applied in one working day. It is an excellent finish for all kinds of wood used in furniture, etc. It is waterproof and will not scratch white; is more durable than real shellac and builds up a finish in fewer coats. Seal Lac can be used for sealing and sizing porous surfaces.

Seal Lac can be thinned the same

For war camps and barracks as well as for quickly erected housing for war workers, a prefabricated fiber board panel, coated with a washable ivory finish at the mill has found great favor. The large panels are quickly put in place and the saving in time of labor, plus at attractive appearance and cleanliness of the finished surface, account for the success of this product.—S. P. Wilson, Ph. D.



IN STEP WITH THE TIMES

Industrial Finishes

that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• FOR APPLICATION BY ALL METHODS

JAMES B. DAY & CO., CHICAGO

War Business: We show a high percentage of Priority business, having developed many protective coatings for the nation's war industries and for Federal Agencies. We do not believe that it is necessary or desirable to go into details in this connection.

Civilian Business: We are not emphasizing civilian business at the present time, but in that relatively small percentage of our sales where we continue to supply products for civilian use, we have endeavored to concentrate on the use of non-critical materials and to reduce the cost.—The Stille-Young Corp.

as 5-lb. cut shellac, using benzine which is much cheaper than alcohol. On new work, thin first coat with 40% benzine. On second coat add 20% thinner. Seal Lac is a quality product and not to be confused with cheap rosin substitutes which were so common at one time.

The manufacturer of Seal Lac also makes a complete line of industrial and government specification finishes. —Longman & Martinez.

Chemical-Resistant Enamel—Is intended for protecting surfaces that may come in contact with water, dilute acid and dilute alkali. It stands up well on exterior exposure; is furnished in light gray or black.

The gray is a heavily-pigmented enamel made of titanium dioxide and a quick-drying long-oil varnish. The varnish consists of processed vegetable oils, phenolic resin and solvent.

The enamel may be sprayed by reducing 3 parts enamel to one part of C. R. solvent. It will set to touch in 15 minutes, will dry to handle in one hour, and to recoat in 24 hours. (Mineral spirits are not satisfactory as a reducer.)—Hilo Varnish Corp.

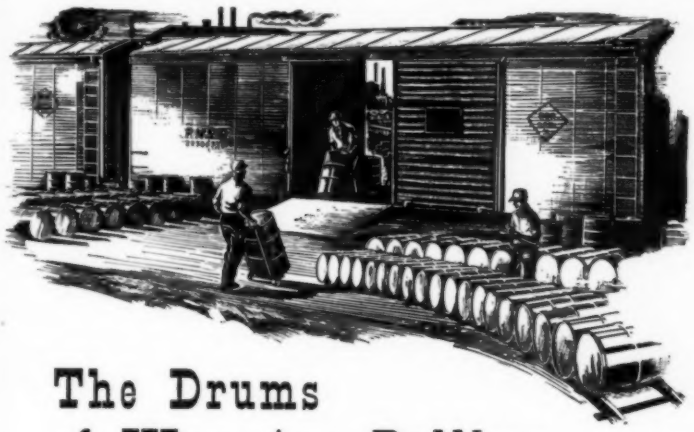
2-Coat Bake Finish for Fiberboard Reflectors—A simple 2-coat system for finishing the fiberboard, which is being substituted for steel in fluorescent light reflectors, has been perfected. Baking schedules of 15 minutes at 250° F., or equivalent, are used. Already in successful production, this finishing system has proved its ability to eliminate all blistering and minimize warping of the reflector, as well as eliminating the necessity of prebaking the fiberboard in practically all cases. It can also be baked in infrared in 4 minutes or less, and in as short a time as 6 minutes in a convection oven. Special emphasis has been placed on hardness, mar resistance, high reflectivity, color stability and permanence of reflectance. —Liquid Plastics Div., Ferro Enamel Corp.

White Lacquer — White undercoat, for photo template work on bonderized or parkerized steel and Masonite. —United Lacquer Mfg. Co.

Tuf-Tex, No. 711—Spray full body over No. 165 Sealer, where varnish is desired as final coat. Sets out of dust in one hour. Dries hard overnight for rubbing or packing for shipment. —Reliance Varnish Co.

Clear Shatterproof Lacquer, ES 608A —This lacquer was developed to meet conditions induced by severe concussions, such as by bombings and explosions. Has great flexibility and is extremely tough.—United Lacquer Mfg. Co.

Baking enamels and lacquers protect secret instruments aboard submarines blasting the Axis from beneath the oceans, and ignition-cable lacquers and sound-deadening adhesives soar into the stratosphere with America's super-bombers.—The Arco Co.



The Drums of War Are Rolling

Out of the Berry Brothers factory, along an ingenious narrow-gauge track, an endless stream of steel drums, containing Berry Brothers Wartime Finishes, rolls on day after day.

Over this track roll the primers, lacquers and camouflage materials for the most famous American fighters and bombers.

This is Berry Brothers' fourth war. Thomas and Joseph Berry had been in business seven years when the Civil War ended. Volume production of quality Industrial Finishes under wartime conditions is therefore nothing new to Berry Brothers. Far-reaching technical research ...new product development...the constant improvement of older products... the search for better ways to serve our customers...go on continually.

Of this you may be sure: When the war is over, we will be ready with the industrial finishes needed then.

BERRY BROTHERS

Quality Finishes Since 1858

INDUSTRIAL VARNISHES • ENAMELS • LACQUERS

DETROIT, MICHIGAN WALKERVILLE, ONTARIO

JERSEY CITY • BOSTON • CINCINNATI • CHICAGO • ST. LOUIS

Special-Lac—This material is claimed to be a perfect alternate for shellac. It looks like shellac, having the same body as a 5-lb. cut, reduces with denatured alcohol; has identically the same drying time and imparts a tough durable film that will not turn white on contact with moisture. This product is completely waterproof. It is available in white and orange.—Rudd Lacquer Corp.

Clear Lacquer—For preservation of original drawings for photo template work on Masonite and plastic materials.—United Lacquer Mfg. Co.

Zinlac—A new shellac substitute, which is an alcohol finish, and has all of the properties that make shellac popular. It compares favorably with shellac as to drying, spraying and leveling, sanding and rubbing, water resistance, scratching and marring. It can be applied where shellac has been used, and can be treated exactly like shellac. Actual tests have proven that Zinlac is harder at the end of 3-hour period.

Zinlac is particularly good for use in wood finishing because of its penetrating qualities, and the fact that it grips into the wood and will not peel off. The finish can be applied either with a brush or spray, and can be thinned with ordinary alcohol to any desired consistency.

Zinlac is entirely new and is economical and easy to use. It produces a hard clear surface which brings out the grain of the wood; is more resistant to moisture, scratches and mars than shellac, and has already been approved by the War Department for use where shellac has been previously specified.—William Zinsser & Co.

Owing to the restriction against metal for reflectors for fluorescent lamps used for lighting war-plants, great interest is being found in high-reflective white finishes for the various substitute materials, such as Presdwood, Gypsum-Board, etc. Baked finishes of the urea-Alkyd type have been used, but where difficulty is found in distortion of the board or blistering, an air-dry finish of high reflectivity and resistance to cleaning agents and acid fumes has been developed. Since no baking is required, warping and blistering are eliminated.—S. P. Wilson.

Spray-stenciling a loaded and boostered bomb. Photo, courtesy The DeVilbiss Co.

Gloss Lo-Vis-Lac, No. 757—Spray two coats full body two to four hours apart, over No. 165 Sealer, where lacquer is desired for final coats. Dry overnight, and rub with pumice and oil.—Reliance Varnish Co.

Lubrisol Pad-O-Paque Process—For furniture finishing and refinishing. Finishing Laboratories, Inc., originators and manufacturers of the nationally famous Lubrisol Pad-O-Paque process, in an attempt to relieve the nation's overtaxed transportation facilities and to preserve metal and glass containers, has highly concentrated all of their products wherever concentration is possible. This concentra-

Lowe Brothers System Slashes Finishing Time on Gun Mounts 75%

Lowe Brothers research and field technicians are constantly cooperating with U. S. Government contractors to speed the finishing of vital war weapons and materials. And often we are able to make recommendations which earn the hearty approval of both the Government and its suppliers.

Recently, for example, a maker of Gun Mounts was faced with lagging production due to the slow-drying finish of these urgently needed parts. He asked Lowe Brothers for help. After a careful study of the problem we suggested a faster-drying primer and finish coat.

Result—the finishing time necessary for both coats was reduced from four days to one day—everybody concerned was pleased, and now these urgently needed Gun Mounts are finished completely in one working day.

Perhaps you, too, can profit by Lowe Brothers experience with U. S. Government Specification Finishes. Why not consult us about information on costs, bids or drying schedules on U. S. Government Specification Finishes — or call us for help on any industrial finishing problem.

INDUSTRIAL SALES
THE LOWE BROTHERS CO.
DAYTON, OHIO

Lowe Brothers
WARTIME FINISHES for Industry
IN ACCORDANCE WITH U.S. GOVERNMENT SPECIFICATIONS
AND MAINTENANCE PAINTS
TO MULTIPLY YOUR MAN POWER EFFICIENCY

The most recent finishes we have added and which can be classified as new will ask for it on their letterhead, giving us the name and title of the individual intersome of the more up-to-date finish manufacturers, we have developed a line of finishes to meet government specifications. These finishes are, of course, intended for use on the products of war.

Many of the specifications for which these finishes are being made are contained in a book recently compiled by us and which we offer to interested manufacturers who will ask for it on their letterhead, giving us the name and title of the individual interested and, if possible, the type of contract or contracts which this firm holds.—Egyptian Lacquer Mfg. Co.

tion is produced in three forms—XX concentrated, X concentrated, and concentrated.

In concentrating these products, none of their high quality has been sacrified. On the contrary, the quality has been improved. In concentrating these products the manufacturer has increased the basic materials to peak load, leaving out the cutting agents and solvents that may be procured locally and added by the user to suit himself.

Finishers all over the country find that their refinishing is easier, quicker and more economical by using these highly concentrated materials. Not only are the basic materials used in these products the best materials procurable, but the application and cutting of these products are so simple that major repairs to damaged furniture may be effected in a short time, with a minimum of effort and cost. —Finishine Laboratories, Inc.

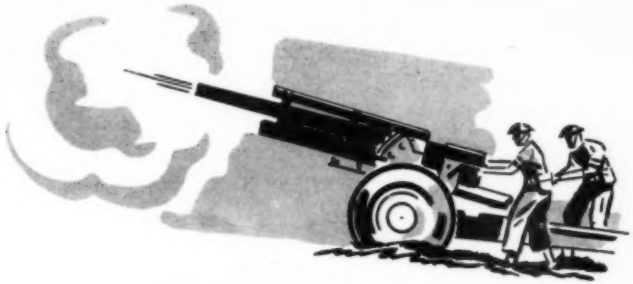
Platelustre—An acceptable substitute for electroplatings was found in a transparent lacquer-enamel, known as "Platelustre." This finish, applied to polished metals, simulates brass, copper, bronze, color-treated aluminum and steel, and other metals.—Maas & Waldstein Co.

Masonite "Shower Bath" Finish—Defense housing shower-bath cabinets, using Masonite as a substitute for steel, require a finish of excellent appearance with resistance to damage during packing, shipping and installation, as well as outstanding moisture and alkali-soap resistance. A Vedoc system consisting of primer and finish has been developed especially for this purpose. Short baking schedules and high coverage rates make this system unusually efficient and economical.—Liquid Plastics Div., Ferro Enamel Corp.

Helmet-Liner Bake Finish—We have developed an improved coating for helmet liners for quick infra-red baking. Improvements consist of better adhesion to the phenolic resin with which the canvas duck is impregnated. This contains materials to roughen the surface and also passes the delousing test.—Berry Bros.

Longman's Self-Priming Flat—A new flat oil paint that seals, primes and finishes in one coat. For application by brush or spray on all interior walls and ceilings—new or old painted plaster, wallboard, concrete, brick, etc. Well bonded calsomine does not

Government specification finishes that meet the specification and in addition are custom-tailored to meet the contractors' production setup as nearly as possible are being produced by a company whose specialty is, as always, "Fitting the Finish to the Product."—Liquid Plastics Div., Ferro Enamel Corp.



INFRA-RED REFLECTANCE

Lustreless Olive Drab finishes (AXS-684 etc.) formulated to meet government requirements for infra-red reflectance, are included among the many paint products O'Brien is making for war purposes. Each of these products meets government specifications. Each is made to the same high standard of quality for which O'Brien Industrial Finishes have been known for 68 years.

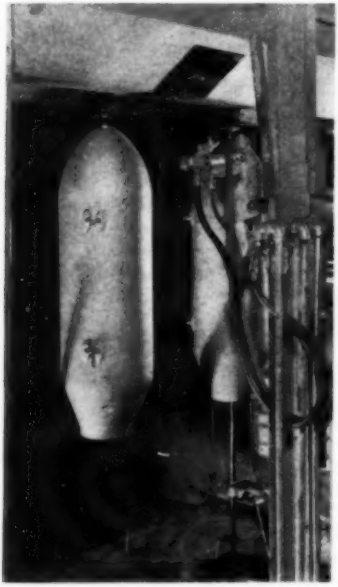
We are in a position to serve a limited number of new customers. Let us quote on your requirements.

SEND FOR DATA SHEETS. These data sheets give you detailed, up-to-the-minute use and application information on O'Brien AXS 680, ES 680 and other war material finishes. Sent free on request.

O'BRIEN VARNISH COMPANY, SOUTH BEND, INDIANA

have to be washed off before applying this new paint. Coverage, 650-sq.ft. per gallon. Washable with soap and water. The paint is available in six colors and white.—Longman & Martinez.

Non-Priority Rip-pl Black — Made from raw materials which are currently non-critical, so that no priority is required. It forms a film which shows a large coarse pattern. Spray full body. Apply a heavy film. Bake at 250° F. for 2½ hours. For a shorter schedule, hold at 250° F. for 30 minutes, at which time the design should be fully formed and set; then raise the heat and shorten the time to, say, 1 to 1½ hours at 300° F.—Hilo Varnish Corp.



Automatically coating the exterior of 250-lb. bombs by means of high-speed automatic spray-painting equipment. Photo, courtesy The DeVilbiss Co.

Durad Luminous Paint—Used to make objects visible during blackouts. It owes its luminosity to a non-radioactive substance that is activated by daylight or ordinary electric illumination. After a few minutes' exposure to light, it glows for hours, and, upon re-exposure, will react the same way.—Maas & Waldstein Co.

Rudlac Brushing Lacquer—Designed for use on floors. Imparts a high-gloss waterproof finish in one coat.—Rudd Lacquer Corp.

Glasshield — A transparent coating which gives ordinary glass the property of safety glass, in that it does not shatter when broken by severe vibration. This new product may play an important part in civilian defense, inasmuch as many casualties during air raids are due to flying pieces of glass.—Maas & Waldstein Co.

Shellac Replacement—A wood-finishing product that has all the desirable qualities of shellac. It has been thoroughly tested over a long period; has extremely high resistance to water; thins with alcohol, dries fast and hard, sands easily.—New York Woodfinishers' Supply Co., Inc.

Commercial Refrigerator Finish — Vedoc olive drab synthetic for infrared baking (4 minutes) finds a wartime use on walk-in refrigerators. All of the usual properties necessary

For the occasional wood-finishing job, where force-drying facilities are available and where rubbing property is not a primary factor, some of the urea-formaldehydes offer interesting possibilities. They have excellent clarity, print, water and alcohol resistance, but they are not noted for their amendability to rubbing. They tend to rub quite gray and their check and scratch resistances are not high.—W. T. Smith.

PROTECTIVE COATING

(patent applied for)

An entirely new development in the field of industrial finishes.

It is a surface coating having quick-drying characteristics of lacquer combined with the durability and build of synthetic and oil base materials.

Whatever you are making—investigate finishing with "905" Protective Coating.

For complete technical data and performance facts write for the 905 P. C. TECHNICAL BULLETIN.

STANDARD VARNISH WORKS

NEW YORK — — CHICAGO

The keynote of our policy is simply to aid the war effort in every possible way we can and to obey not only the letter but the spirit of the many government restrictions. For our civilian business we are constantly casting for materials which are not critical and which in no way will retard the flow of materials to points where they are needed the most.

It requires great agility to do this and our success in doing so in the past, we hope, will be a prelude to our success in the future. This, of course, is done with the thought constantly in mind of furnishing protective coating finishing materials which will do the job they are required to do.—Southern Varnish Corp.

in a successful commercial refrigerator finish have been incorporated in this special finish, and the 4-minute bake eliminates any chance of a finishing-room bottleneck on these important war products.—Liquid Plastics Div., Ferro Enamel Corp.

Alkyd Finishes—The alkyd finishes we make are truly synthetic organic plastics. Glycerin, phthalic anhydride and vegetable oils or the fatty acids of such oils are compounded and chemically reacted with the aid of heat in special stainless steel kettles or reactors to produce what would be a solid plastic mass or substance, except that while still hot this resinous plastic is dissolved in an organic solvent and thus conveniently maintained temporarily in liquid form. Later, the user spreads it in a thin film, the solvent is dissipated and the plastic mass, often with the aid of further heat treatment, becomes a serviceable plastic film or "veneer."

New finishing systems for aircraft plywood, that "innocent sandwich of glue and wood," are currently giving aircraft manufacturers new production problems. One of the major problems is that of effective finishes. Finishing systems must have minimum weight, production speed in application, resistance to the invasion of moisture, protection against extreme changes in temperature and durability against the ravages of vibration.—Ault & Wiborg Corp.

Urea-formaldehyde synthetic resins are also plastics commonly used now in organic coatings, usually in combination with alkyds.—Forbes Varnish Co.

Texkin—A protective cream for hands of workers exposed to irritating or staining effects of vapors, overspray or liquids used in metal cleaning, industrial finishing and painting operations.

Because of its composition, it dries in about a minute to a tough, impervious, glove-like film, which does not impair sensitivity. In fact, when dry, the user is totally unconscious of its presence. Even under the heaviest type of work, this Texkin film will last for hours, protecting any skin to which it is applied.

Texkin is removed by simply washing with warm water and mild toilet soap—leaving the skin soft, clean and fresh. Thus the load of grease, grime, paint or varnish, lacquer or dye, machine oils or cutting oils, everything which might soil, stain and irritate the skin is washed away without the use of strong solvents or gritty soaps.—Doster & Co.

Protektol (a Removable Non-Permanent Protective Coating)—Protektol is a clear, transparent liquid plastic. Basic-transparent red, blue, green and the familiar yellow-green of zinc chromate primer in a special rust-inhibiting type.

Reasons for adding color are threefold. First, the color acts as a guide during application and insures ade-

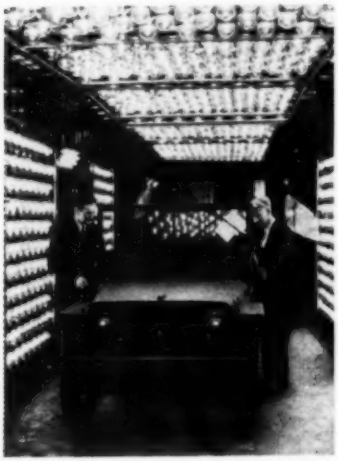
Now Licensed FREE for War Production

For the duration, free licenses to use the Commercial Solvents Hot Lacquer Process (U. S. Patent No. 2,150,096) are being granted to producers of war materials.

The hot lacquer process, perfected by Commercial Solvents, saves volatiles... saves time...saves labor...advantages of inestimable value to the war program.

COMMERCIAL SOLVENTS
Corporation
17 EAST 42ND STREET, NEW YORK, N. Y.

FINE CHEMICALS FOR FINE PRODUCTS



Drying paint by infra-ray lights. Photo, courtesy of Office of War Information.

quate film thickness (minimum, one mil). Secondly, the several colors can be used for the identification of various types of stock. Thirdly, color insures complete removal when the film has served its purpose.

Protektol may be applied by brushing, spraying, dipping or roller-coating. It is supplied ready for use, but special reducers are available to adjust viscosities to suit variable conditions and equipment. Protektol reducers must be used. Ordinary reducers are not compatible with it and will cause precipitation of the plastic.

Protektol sets quickly (in from 5 to 10 minutes) and yields a film of exceptionally high tensile strength and considerable elongation, but of low adhesion. This combination of properties permits the film to resist the abrasive action of metal particles, dust, dirt, etc., to stretch with the metal in stamping and drawing operations, and, when it has served its purpose, to be removed in a sheet by simply prying loose a corner and lifting the film off the object in question, taking with it all of the dust, dirt, oil or other contamination to which that object has been subjected, both before and after treatment, and leaving a spotlessly clean surface on which to apply subsequent coats of zinc chromate primer or other finishing materials.

The films, after removal, can be collected, baled and returned to the manufacturer for re-processing, thereby being used over and over again, and thus effecting, over a period of time, substantial savings in cost.—Ault & Wiborg Corp.

Surfacene Combination Stain and Filler—Has the clarity of water stain and filler combination; will dry in 5 hours for recoating; saves one handling and one application cost. You can put on the stain, filler and varnish sealer in one day. On second day apply a rubbing and polishing varnish; rub on the third day. We also created a pigmented wiping stain in this same class. It is fast drying and gives great clarity. For the finishing coats, Cleco varnish sealer, rubbing varnish and flat varnish.

We have other new items now in the formative stages upon which we do not want to make comment.—Glidden Co.

Among the subjects listed by the chemical director in his memorandum report are many more items indicative of the nature and magnitude of behind-the-scenes military paint research. For example, "in cooperation with the U. S. Army Quartermaster Corps and a committee of the WPB, Du Pont has carried out a lengthy program for the purpose of establishing alternate vehicle compositions to eliminate scarce raw materials. This program has involved the preparation and exposure of approximately 150 different topcoat compositions for potential use on Army motorized equipment."—Du Pont Co.

U. S. GOVERNMENT SPECIFICATION FINISHES
". . . a lacquer, air drying, and thinner for oxidized brass eye rims for gas masks . . . shall dry hard within 7 minutes after spraying on a brass plate . . . when sprayed on an eye-ring shall not show abrasion, chipping or peeling when crimped in position . . ."
These are just a few excerpts from a rigid specification required by our government for the metal finish on gas masks. ☆ Our booklet "Information on U. S. Government Specification Finishes," sent free on request, describes the specifications for various types of finishes, and the Maas & Waldstein products which have been developed to meet them. ☆ When new problems arise requiring special finishes, our laboratory will gladly assist you.
MAAS & WALDSTEIN COMPANY, NEWARK, N. J.
PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALTY FINISHES FOR ALL PURPOSES
BRANCH OFFICES & WAREHOUSES: 1659 CARROLL AVE., CHICAGO, ILL. • 1228 W. PICO BLVD., LOS ANGELES, CALIF.
M&W

War-Changed Finishes

BY RAY C. MARTIN

THE RESPONSIBILITY of the protective coating industry, particularly under wartime emergency conditions, is clear cut. As an industry it has a job to do; that of making available such coatings required by war demands, in the quickest possible time, and having these coatings perform under conditions heretofore considered impossible.

With the chemical raw materials picture being limited because of demands placed on them for other uses, it is no easy problem today to project finishes in terms of performance, although for the most part military finishes are procured on a performance specification. A short time ago the protective coating industry could secure nitrated cellulose based on cotton in any desired viscosity. Today we are using nitrated wood pulp to a large extent; the nitrated cotton linters are required in the manufacture of smokeless powder. Our solvents and plasticizers were available in large quantities, but today they are needed for explosives, synthetic rubber and antifreeze compounds.

Pigments (metal and ores) have a definite functional use in the war program. Gums and oils, which were normally imported, have been cut off. Synthetic resins and similar plastics have definitely "gone to war," being used in aircraft, tank and mobile equipment, and as substitutes for rubber in tubing, etc. Our demand for these raw materials, for the most part, is far in excess of our supply. True, there are new plant expansions and new projects being brought in from time to time, but we can expect the demands to keep pace with this increased supply.

We look at restriction and essentiality of end product use. *"Essentiality" is the basis of more decisions at Washington, D. C., than industry realizes. It is the determining factor by which decisions are made regarding allotments and priorities at War Production Board, rationing at OPA, certificates of war necessity at ODT, etc. "Essentiality" from the commodity administrator's viewpoint means: How essential is it to the direct war effort? Essentiality has likewise been felt in the matter of manpower. Younger chemists and specialists are carrying on, and in an admirable and commendable fashion. There is a job to do and there is no question but what the protective coating industry will do the task assigned and do it well.*

Conventional "varnish" finishes have been long discarded, being replaced by newer "synthetic finishes." A large number of these compounds, like our mechanized army, are receiving their baptism of trial and undoubtedly will become the basis of finishes for our future. Notable among the newer resins and coating compounds are

AMERICAN INDUSTRY . . .

HAS WON THE ARMY AND NAVY "E" FOR A GREAT PRODUCTION RECORD

Serving many of these "E" concerns, we furnish L-MAC-E War and Victory Finishes, all laboratory controlled, to meet war production specifications. Several are listed here, although space does not permit mention of all of them—

U. S. ARMY ORDNANCE SPECIFICATIONS

ES-680a, Class No. 101, Rust Inhibiting Primer K-126
ES-680a, Class No. 204, Lusterless Olive Drab Enamel E-110
ES-680a, Class No. 102, Refinishing Primer K-124
ES-680a, Class No. 637, Thinner T-92
ES-680a, Class No. 638, Clear Wood Sealer
Type No. 1, Rot Inhibiting (1 hour dry and slow dry)
Type No. 2, Non-Inhibiting (1 hour dry and slow dry)
Primer, Synthetic, Refinishing AXS-751 Blue Drab Stencil Paint AXS-753
Enamel, Olive Drab, Synthetic, Lusterless AXS-752
The above specification materials are used on a great variety of war products such as large guns, tanks, trucks, wooden chests, etc., for Ordnance and Signal Corps.

OQMG No. 63-B BUNK BED SPECIFICATIONS

Neutral Gray Primer K-140 Olive Green Gloss Enamel E-116
These materials are used for Army single and double bunk beds.

U. S. ARMY SPECIFICATIONS

3-106-E Seal Brown Acid Resisting Finishing No. 16597
3-106-E Dark Seal Brown Acid Resisting Finish No. 16957-D
These materials are used on Army cartridge crate cases and may be reduced from two to three parts with V M & P Naphtha to one part of the finish.

U. S. NAVY

No. 84a Zinc Chromate Primer K-125 Navy Blue Crate Paint E-111
No. 57-B-22 Boxes; Boat, Empty, E-109 Navy Blue Crate Paint E-115
TT-V-121a, Spar Varnish No. V-587
Navy Blue crate paints are being used on Navy crates where no definite specifications are required. The Spar Varnish will pass all the required tests.

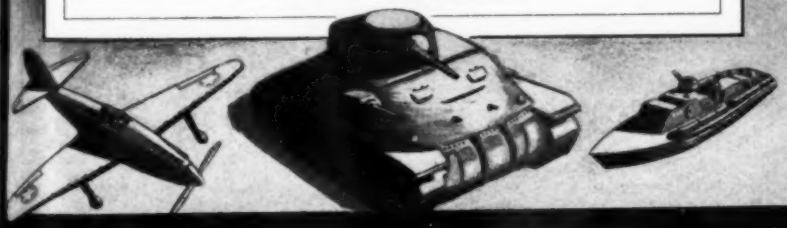
AERONAUTICAL SPECIFICATIONS

Sealer; Wood, Liquid, AAF Spec. No. 14113
Surfacer; Wood, Liquid, AAF Spec. No. 14115
Bakelite Varnish; Army-Navy Spec. AN-TT-V-118

FEDERAL SPECIFICATIONS

TT-V-81a, Aluminum Mixing Varnish No. V-569
TT-V-71a, Interior Varnish, Type No. 1, Type No. 2
TT-S-176, Class No. 1, Clear Floor Sealer No. V-582, Class No. 2, No. V-583
These materials will meet all of the Federal Specification requirements.

We also manufacture a considerable number of other U. S. Navy-Army and U. S. Maritime specification materials.



THE LAWRENCE-McFADDEN CO.

Headquarters for Fine Finishes Since 1875
7430 STATE ROAD PHILADELPHIA, PA.

the vinyl polymers, such as the vinyl acetals and vinyl esters, urea and melamine resins, alkyd resins and others.

Vinyl Acetal Resins

Polyvinyl Acetal and Polyvinyl Butyral: These are exceptionally hard and tough resins, having high cohesive strength and possessing excellent resistance to abrasion. For lacquer work, they should be admixed with other resins. They are useful as an impregnating dope for fabrics, paper, felt, etc. They produce excellent lacquer adhesives and hard and tough lacquer coatings, being especially useful where conditions require some of the special properties which these resins possess. As a plastic layer in the lamination of glass and as a plastic layer in the lamination of wood, they give exceptional strength.

Vinyl Ester Resins

Polyvinyl Acetate and Copolymer Vinyl Chloride-Vinyl Acetate: The copolymer vinyl chloride-vinyl acetate is the most important of the long carbon-to-carbon chain molecules, and is most frequently used in protective coatings. It is a permanently thermoplastic material of great strength, toughness and inertness. The material is handled in much the same manner as lacquer, being soluble in volatile solvents, and it dries entirely by solvent evaporation. It is not compatible with the usual paint and varnish drying oils and resins.

The copolymer vinyl resin is used alone as the basic film-forming material and is not compatible with cellulose lacquers. The resin itself is transparent, colorless, tasteless, odorless and non-toxic, and will not support combustion. Coatings formed from this resin show excellent adhesion toughness, abrasion and water resistance.

Color Goes to War

THE GREEN chlorophyll of nature has the unusual property of reflecting infra-red light in good abundance. This quality is not found, however, in most green pigments. Thus a green leaf and a green paint which may seem to be perfectly matched to the normal eye may, in an infra-red photograph taken from an airplane, show up as white and black.

According to data released by the Color Research Laboratory of the Eagle Printing Ink Co., Division of General Printing Ink Corp., New York, N. Y., pigments are to be formulated which have high reflectance in infra-red. These are being used for paints and finishes, and with them modern warfare is able to do an excellent job of camouflage.

Color is also going to war in many other ways. Tanks are painted white on the inside to repel heat and to gain all possible visibility from the trickle of light that enters from the outside. Shells of different gauges are marked in different hues to aid instant identification. In aerial target practice, bullets stained in different hues leave telling marks which later may be examined, and the gunners accordingly credited with hits.—HERBERT KAUFMAN.

Glidden Co., 25 Years Old

Many important facts about The Glidden Co., Cleveland, Ohio, are presented in four pages of typewritten material, prepared for distribution on the company's 25th anniversary, December 17, 1942.

The company was founded in December, 1917, by Adrian D. Joyce, who is still president. It now has several plants, including a number of paint factories, and is second largest manufacturer of paints and varnishes in America.

Remember Pearl Essence for

ALUMINUM
GUNMETAL
BRONZE
BRASS
NICKEL
FINISHES

THE MEARL CORPORATION
153 WAVERLY PLACE NEW YORK, N. Y.

Factories

ROSELLE, N. J.

EASTPORT, ME.

MEARLMAID PEARL ESSENCE

Priority Rating Is Not Required

Available in Unlimited Quantities

"WORLD'S LARGEST PRODUCER OF PEARL ESSENCE"

Automatic Shell-Coating Equipment

A new line of high-speed, automatic shell-coating equipment has just been announced by The DeVilbiss Co., Toledo, Ohio.

Designed for a wide adaptability in finishing operations, this equipment automatically paints bombs, shell, shot, grenade and cartridge cases of all kinds, in sizes ranging from 20 to 155-mm. Some types spray exteriors only, while others paint both inside and out, depending upon the requirements of the job. The outfits handle with equal facility all of the finishing and coating materials commonly specified for ammunition.

Every unit, though basically similar, is engineered specifically to do a particular job. Spraying stations are located at one or both ends of the conveyor depending upon specified production rate. On one type, three stationary automatic spray guns are actuated only when each shell moves within spraying range. Another outfit employs two guns, one for inside and one for outside spraying. Both are automatically moved horizontally and vertically with the shell. A third hook-up for shells having an inside adapter, has a spray gun with a hook-type extension. This and another moving extension gun coats all interior surfaces, while a third moving gun paints the outside. Conveyor length is determined by the drying and handling requirements of each job. Either dry or water-wash exhaust is furnished, as desired.

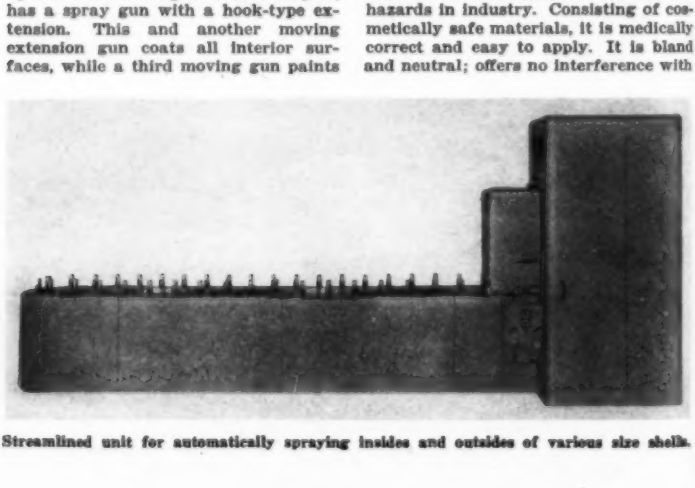
In the development of this new line of equipment, the DeVilbiss Co. has given every consideration to the need for high speed with uniform finish, and for the conservation of as much valuable production floor space as possible.

New . . .

MATERIALS SUPPLIES EQUIPMENT

Skin Protection

M. S. A. Fend is an industrial skin cream for the protection of workers' skin against industrial dermatitis. Fend cream provides a protective barrier on the skin against many specific hazards in industry. Consisting of cosmetically safe materials, it is medically correct and easy to apply. It is bland and neutral; offers no interference with



Streamlined unit for automatically spraying insides and outsides of various size shells.

the normal action of the skin glands; is readily removed with mild soap and warm water.

Each of the six different types of Fend products provides protection against a number of specific skin hazards. These types are the result of intensive research into the problems of industrial dermatitis and are declared to mark a definite advance in modern skin protection.

Complete details on M. S. A. Fend products are presented in a 16-page brochure just issued. Copies may be secured by writing to Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Penna.

Non-Skid Waterproof Deck Covering

A new non-skid type of deck covering for ships, which can be readily applied to steel or wood with a brush or trowel, has been developed by the Building Materials Division of the Armstrong Cork Co., Lancaster, Penna.

Durable and waterproof, this new material will be marketed under the name of Armstrong's Lightweight Deck Covering. It forms a ready bond with the decking and no elaborate preparation is necessary before application. Designed primarily for the exposed deck, it may also be used on inner decks.

The new material is manufactured of high-grade rosins and contains no asphalt. In deck areas where particularly heavy traffic tends to bring rapid wear on the deck covering, all that is necessary to correct this condition is to apply a thin coat of the material to the deck areas involved.

This new deck covering is available in four colors, black, red, blue or gray, and is suitable for use on gun platforms, catapult walkways, signal bridges, and other areas aboard ship, as well as on ramps and other areas where a highly non-skid surface is essential.

In addition to its present military use, this material offers many possibilities for civilian service.

Specifications
+
PLUS!
Adaptation of formulae to the individual requirements of busy war contractors.
★ ★ ★
Within specification limits there are many possibilities of improvement in speed, workability, and freedom from rejects.
This PLUS factor is worth considering. We'd like to tell you more about it.
★ ★ ★
THE VARNISH PRODUCTS COMPANY
CLEVELAND, OHIO
★ ★ ★

Faster FINISH BAKING Speeds WAR SUPPLIES

DESPATCH Continuous Type Ovens Set Records

With construction features geared to round-the-clock operation, Despatch ovens are setting new records in several major plants—for greater output of high quality finish-baking.

Your plant can likewise profit immediately from the faster baking provided by these units.

★ **BAKES FASTER** using larger heater-fan-duct combination. Saves fuel.

★ **EASY HANDLING** with continuous or batch-type loading systems, horizontal or vertical. Saves labor.

TRY THIS SERVICE! Let a Despatch engineer check your plant and recommend a tested and approved Despatch oven suited to your needs. WIRE OR PHONE TODAY. Ask for Bulletin 51.

DESPATCH OVEN COMPANY

Questions; Answers

Questions are welcome and will be answered promptly by mail. Readers are invited to prepare and send in additional information relating to any of these questions and answers.

War Coating Problem

Equipment that we are building for the U. S. Army Signal Corps involves the enameling of large quantities of bolts and wood screws, and some metal parts up to 24-in. in length. Spraying these items involves considerable time spent in handling small quantities. Dipping gets heavy coats of paint into tapped hole and threads of bolts. We have contacted several manufacturers of tumbling equipment, but prospects of delivery before two or three months seem remote, and by that time we expect our contract to be completed.

Any suggestions you might have, that would help us in this situation, will be appreciated.—T. Radio Co.

This is quite a problem. In regard to bolts and wood screws, we have seen these placed in the holes of large panels and then set up to spray. The holes in the panel shield the threaded part of the bolts and screws. Of course, this involves individual handling of each screw and bolt, and it results in the waste of a great deal of paint.

In regard to preventing paint from getting into the threaded holes of certain parts that are

WHAT ABOUT 1943?

● With business as "unusual" in 1943 it's up to live manufacturers to use ingenuity and skill to produce practical and novel finishes on old and new products—for increased sales and profits.

★ CLAREMONT FLOCKS ★

COTTON — WOOL — RAYON

Provide an unusually practical and attractive finish—at low cost. Simple to apply—and profitable too. Get into flocking for 1943.

Write for color card and samples.

CLAREMONT WASTE MFG. COMPANY

CLAREMONT, N. H.

The country's largest mfrs. of Cotton, Wool and Rayon Flocks

sprayed or dipped, our only suggestion is to plug these holes with removable plugs. We have seen this done frequently.

Without knowing more clearly just exactly what you have to paint, we are not in the best position to solve your problem effectively. Could you send us a pencil sketch or catalogue picture showing these parts more clearly?—Ed.

Fungicides for Paint

What fungicides are used to incorporate in paint to discourage fungus growth, and how much should be used per gallon of paint? —C. F. F.

Fungi, commonly know as mildew, is a minute moss-like plant growth. Its color varies according to environment—usually in the darker shades of greens and browns. It generally occurs in damp low places near the ground, where there is lack of sunshine. The southern damp climate is more inducive to its growth than colder and drier climatic conditions.

Although it will grow on plain, unprotected masonry, it will also grow on water paints, but more abundantly on oil paints, particularly those compounded with raw linseed oil.

Mildew is a surface growth and can be easily washed off with any of the mild, caustic cleaning compounds, except when the surface is porous enough to permit the growth to form in the pores. A liberal application of a 1% or stronger solution of bichloride of mercury (corrosive sublimate) will kill mil-

An Outstanding —

ENAMELS
BAKING ENAMELS
LACQUERS
SEALERS
PRIMERS
SYNTHETICS
VARNISHES
SHELLAC
FILLERS—STAINS
FINISHING SUPPLIES

Shellac Replacement Product

Has all the desirable qualities of Shellac.

Has extremely high resistance to water — Thins with alcohol — Dries fast and hard — Good adhesion — Sands easily.

It is a development of our laboratory and has been thoroughly tested over a long period.

A GENEROUS WORKING SAMPLE WILL BE SENT FREE ON REQUEST. WRITE TODAY.

NEW PERIOD PRODUCTION FINISHES

NEW YORK WOODFINISHERS SUPPLY CO., INC.
109 IMLAY STREET BROOKLYN, N.Y.
Established 1917

dew — at least for a reasonable length of time, or until the chemical is washed out or weathered. This solution is easily made by dissolving about 1-oz. of it in denatured alcohol, adding same to about one gallon of water. Wood alcohol will perform similar functions but is not as strong nor as permanent in its actions.

The mercury solution can safely be used in water paints as well as in oil paints. However, it will affect white or lighter-colored oil paints by changing their color considerably. The darker colors are not as easily affected.

Thymol is another effective fungicide, used similar to mercury, although it does not have its objectionable features. However, its high cost makes it almost prohibitive.

Casein and synthetic-resin emulsion paints were formerly more affected by fungus growth than other water and oil paints, but the larger manufacturers are now producing mildew-proof paints of all kinds. There are certain preventive chemicals marketed which can be safely used in paints. The quantities required are about 1% to 2%, making its extra cost very small. One of these chemicals for water paints is Dowicide "A" (sodium ortophenil phenate); for oil paints it is Dowicide "G" 6, made by Dow Chemical Co., Midland, Mich.—GEO. WHIGELT.

Your question, as to the type and proper use of fungicides in paints, is much too broad to admit of a very adequate answer, due to the fact that there are many conditions under which fungus growths appear on painted surfaces.

Brewers' equipment, for instance, is constantly subject to such growths—as are the refrigerator rooms of big meat plants where I have seen 4-in. growths of white fungus appear, even under the best of plant maintenance methods.

Out of doors, especially under trees, near bodies of fresh water, on the south sides of buildings and up under the eaves in warm sections of the country, black mildew is an all-too-frequent painting upkeep problem.

The materials suited to the demands of the food industries limitations in paint may or may not be suited to those mentioned in the third paragraph, hence my opening statement.

For most conditions, all zinc salts and zinc pigment paints are good inhibitors. This is true also of the cupric salts and mercuric salts, such as corrosive sublimate or mercuric chloride. This latter I have found to be the most practical, especially on white or light tints, when incorporated at the rate of 1-oz. of dry sublimate per gallon of prepared paint. This may be ground in on the mill, or stirred into the paint that is used for the top coat only. Under meat storage conditions, or out of door, a 1% solution may be used as a wash when applied with rubber gloves and sponge, on the dried paint, both before and after such growths appear.—RALPH G. WARING, Tuscarora Laboratories.

What's Borax Furniture?

Referring to H. W. Chester's article entitled, "Finishing Wood Pulls and Knobs for Furniture," as published in Nov. 1942 issue of this magazine, I notice the term "borax," as applied to a style or

RONAN

GLOSS SYNTHETIC PROCESS COLORS

Produce brilliant, high-gloss decorative effects by silk screen, with these famous process colors. Smooth working; sharp, clean effects; excellent adhesion on metal, wood, glass, leather, cloth, plastics. Resist water, chemicals, fumes. Many brilliant colors for immediate delivery. Write for detailed color card.

RON-KOTE BULLETIN COLORS

Made with synthetic resin base, these ready-to-use bulletin colors are widely used for decorating, sign and bulletin lettering, etc. Apply smoothly, strong coverage, quick-drying, high gloss. Extremely brilliant, permanent colors. Resist weather, chemicals, fumes, etc. Many attractive colors. Write for color card.

JAPAN COLORS

Ronan Japan Colors excel in purity, tone, uniformity, strength and fineness of grinding. Many shades for use on motor vehicles, signs, furniture, industrial equipment.

T. J. Ronan Co., Inc.

749 E. 135th St., New York City

Paints — Varnishes — Lacquers

NATIONAL PAINT DICTIONARY

Second Edition

$7.50

The second edition of The National Paint Directory by Jeffrey R. Stewart is more than a dictionary; it is really a one-volume encyclopedia of illustrated information conveniently arranged alphabetically and attractively presented in 224 pages 9x12-in. It contains approximately 200 illustrations and charts; includes definitions of trade names and raw materials used in the paint and allied industries; has charts, tables, useful information and miscellaneous data; describes all of the important testing devices and apparatus used in the laboratory; is strictly technical, thoroughly authentic and completely unbiased.

The author, Jeffrey R. Stewart, F. A. I. C., is editor and publisher of the National Paint Bulletin. He was formerly associated as research chemist with Dr. Henry A. Gardner of the National Paint, Varnish & Lacquer Association.

The heavy green covers are attractively embossed and have raised gold letters on a panel of red. The price of this elaborate volume, which looks like $15.00, is only $7.50.

★

INDUSTRIAL FINISHING

1142 N. Meridian St., Indianapolis, Ind.

type of furniture. I never heard of this. Perhaps the word should be "baroque."—W. G. C.

This is a term—possibly a slang term—that has been used for several years among those in the furniture industry, and we feel sure that it is spelled as indicated in Mr. Chester's article. It means a cheap but very gaudy piece of furniture—something that does not belong to any particular period but which is "over dressed" by the use of fancy or imitation of fancy woods, more or less gaudy ornamentation and a high luster finish.

We have referred this question to the American Furniture Mart and here is their reply.

The Encyclopedia of Furniture offers a definition of the term "Borax" which is about the best to be found. The definition is quoted as follows:

"Borax—Colloquial for cheap, showy furniture, particularly intended for the installment trade. Its style is generally a haphazard combination of many motives grotesquely adapted, featuring sheer weight and shiny finishes. Construction is poor, employing constructional features which, in the letter if not in the spirit, are used as sales arguments. Tricky nomenclature as well as specious constructive features permit high-sounding descriptions which trap the unfortunate egoist possessed of a dangerous little knowledge, as readily as the gullible ignoramus capable only of signing an 'easy terms' agreement. The caricaturing of good style and good construction is only part of the implication of the word; the essential balance is the method of advertising, describing and selling.

"The origin of the word is speculative. One guess places it in the

I. C. D. FORMULA NINE
NON-INFLAMMABLE
« wax free REMOVER »
for paint, varnish, lacquer, baked enamel, adhesives
EASY TO APPLY—NO AFTER-CLEANING

PROMPT DELIVERIES

I. C. D. FORMULA 9 is the standard of safety and quality . . can be sprayed or brushed . . doesn't raise grain nor discolor . . quickly removes all kinds of finishes and coatings . . costs less to use . . saves time, labor and material.

SPECIALTY COATINGS—I. C. D. Labs. have specialized in the formulation and manufacture of non-inflammable coatings and substitute finishes. If you have a tough coating or finishing problem send in your specifications, finishing schedule and requirements. Immediate action and a prompt reply promised.

INDUSTRIAL CHEMICAL DEVELOPMENT CORP.
111 MADISON AVE NEW YORK N.Y.

class with premiums formerly given with a well known cleaning compound of borax; others identify it as corrupted foreign-language slang."

You have probably seen furniture that answers the foregoing description.—EDITOR.

Substitute for Toluol

FORMERLY all synthetic enamels were thinned with toluol solvent, but in the past six months we have found two petroleum-base substitutes in Amsco B and Arasol No. 10. Though they are not quite up to toluol in solvency strength, I would say that these substitutes act more as a diluent than a solvent, but for our purpose (aircraft engine finishing), they are satisfactory and more economical.—I. F. M.

Fire-Extinguishing System

At the 31st Annual Safety Congress and Exposition in Chicago, Ill., recently, engineers saw liquid carbon dioxide in public display for the first time when they visited the Cardox Corp. exhibit.

A miniature, composite industrial plant was created for the Safety Exposition to show many times daily a small-scale replica of a typical Cardox engineered fire-extinguishing system in operation. A low-heat alcohol fire was used to activate the system, which automatically detected the fire within a matter of seconds and sounded an alarm bell. A short period was allowed for the imaginary workers to leave the plant before the automatic discharge of carbon dioxide began. While the fire was extinguished almost instantly, the discharge continued long enough to eliminate any possibility of re-ignition.

Cardox Systems utilizing controlled low-temperature liquid carbon dioxide in quantities ranging from one-quarter to 125 tons are in use in many industries where big, crippling fires can start suddenly. The company's address is 307 N. Michigan Ave., Chicago.

New Books

CATALOGS
CIRCULARS
NEWS RELEASES

"Paints for Victory"

A 32-page booklet, under the above title, gives a complete description of a great bulk of the many Federal Specification, Army, Navy and War Production paint products that are now being manufactured. It contains descriptions of each, with coverage figures and also chips showing the actual official colors, such as those, for instance, on camouflage paints and ammunition lacquers. Copies of "Paints for Victory" will be extremely helpful to government and industrial purchasing agents and are available on request, without obligation. Write O'Brien Varnish Co., South Bend, Ind.

Floor Patch Bulletin

Good floors are now more important in factories than ever before — with vital production increased, night shifts operating and many new workers on the job. There is no time for putting down new floors but old floors can and should be repaired. How this can be done quickly and effectively is described and illustrated in a 4-page bulletin published by Flexrock Co., 23rd and Manning St., Philadelphia, Penna. Copies are free.

Black "Jetal" Process

Information, illustrations and charts are included in an 8½x11-in. bulletin about the "Jetal" process for producing a black oxide coating on ferrous metals. The rust-proof black finish, produced by immersion of clean iron and steel parts and products in Jetal baths, does not chip, peel, crack, crumble or dust off, even on bending or cutting. A copy of the bulletin can be obtained from Alrose Chemical Co., Providence, R. I.

New Book, "Substitutes"

An important and timely book, "Substitutes," by H. Bennett, has just been published. It describes new products, processes and materials to be used as substitutes and alternatives for the numerous raw materials which have become unavailable because of the war.

The author is an expert in this field. He has not only given of his wide knowledge of substitutes for numerous products, but has also included the results of the vast experience of many chemists, engineers, and technically interesting to all branches of industry where shortages are an everyday problem.

The contents include substitutes for metals, plastics, textiles, rubber, chemicals, drugs, resins, waxes, paints, oils, fats and many other products. A plan is also given that shows how to determine whether a substitute material is really suitable and whether it will stand up under conditions of marketing and use. Price $4.00. Write INDUSTRIAL FINISHING for your copy.

"Pentrate" Finish Brochure

An attractive illustrated brochure of 20 pages describes the process and equipment used to produce the protective, penetrating black finish "Pentrate" for steel parts and products. It is printed in two colors and bound with plastic, between heavy yellow covers printed in red and black. Write the Heatbath Corp., Springfield, Mass., for a free copy.

Despatch Furnace Bulletin

A 16-page bulletin 8½x11-in., printed in black and red, contains numerous illustrations and information relating to Despatch recirculating furnaces and accessories for use in industrial establishments.

Many Despatch features are listed—several of them patented—that insure better furnace performance. The new high-temperature heavy-duty Despatch fans and indirect gas heating units are illustrated as well as heating systems for gas, oil and electricity.

Aircraft Plywood Finishes

A 33-page loose-leaf book on the above subject has been carefully compiled by the Ault & Wiborg Corp., 75 Varick St., New York, N. Y. It contains much specific and valuable information of a technical nature. The latest book is a revised edition of the one distributed last year. Copies will sent free to aircraft manufacturers.

AS of today, in more than 20,000 firms of all sizes have reached the "Honor Roll" goal of at least 10% of the gross payroll in War Bonds. This is a glorious testimony to the voluntary American way of facing emergencies.

But there is still more to be done. By January 1st, 1943, the Treasury hopes to raise the present total of 20,000,000 employees investing an average of 8% of earnings to 30,000,000 investing at least 10% of earnings in War Bonds.

You are urged to set your own sights accordingly and to do all in your power to start the new year on the Roll of Honor appearing in the "Payroll Savings News." For copy write War Savings Staff, Treasury Department, Washington, D. C.

TIME IS SHORT. Our country is counting on you to

"TOP THAT 10% BY NEW YEAR'S"

Save with

War Savings Bonds

This space is a contribution to America's All-Out War Effort by INDUSTRIAL FINISHING

Industrial FINISHING

Distributed monthly to finishing room and paint shop foremen, production superintendents and company officials of metalworking, woodworking and miscellaneous industrial plants where production finishing is a major operation in parts and products manufacture.

•

Published the 18th of each month by
PRACTICAL PUBLICATIONS, Inc.
1142 N. Meridian St., Indianapolis, Ind.
Telephone.....Riley 6771

•

President and Editor.....W. H. Rohr
Vice Pres. and Adv.-Mgr.....E. A. Dosch
Secretary-Treasurer.....R. E. Suits

•

Subscription Rates Per Year
U. S. and Possessions.....$2.00
Canada and Foreign Countries.....$3.00
(No subscription solicitors are employed)

Editorial

Wartime Painting Achievements

★ The year 1942 saw a great many changes in the painting industry, both as to the type of finishes, paints, etc., and their uses. During the past several months we have seen a rapid transition from the manufacture and finishing of civilian goods to the manufacture and painting of war goods. Factories that were producing and finishing a few hundred pieces of fine high-grade furniture a year ago are now building and painting thousands of pieces of war products each day.

Finish manufacturers, who some months ago were manufacturing high-grade lacquers, fillers and varnishes, are now devoting most of their time and equipment to the manufacture of high-grade paints for finishing war goods. And most of the manufacturers of paints today have almost, and in many cases entirely, disregarded the word profit in order to produce these paints so that they will meet Government specifications satisfactorily.

Due to the scarcity of metal, many war and civilian products that were formerly made of metal are today being made almost entirely of wood or some other nonmetallic material. In order for these products to be made durable they must be finished with a high-grade protective coating. Many of the paints used must be resistant to solutions of acid and to heat and water.

Users of paints have faced numerous problems in changing their methods of finishing from civilian to war goods. Plants that were planned and built to manufacture and finish civilian products have had to make drastic changes in their methods of production and painting in order to produce and paint urgently needed war materials. This is especially true of fin-

★ Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

ishing rooms equipped with modern conveyor systems. But these manufacturers have disregarded cost and have changed their finishing rooms so as to paint and finish war goods.

However, I am sure that in the days to come—many of them dark, perhaps—the painting industry will face every problem and every obstacle with its chin up. And when this war is won we will all be proud of the part the paint industry has played in helping America and its Allies win their great victory for democracy and freedom.—H. W. CHESTER.

Zinc Chromate Primer Has Limitations

★ The original P-27 zinc chromate primer was developed by and with the Navy Department for use on aluminum parts for naval aircraft. The salt-water resistance of this primer, for this particular application, was and still is unexcelled. Its use has been extended to magnesium alloys. Wherever aluminum and magnesium alloys are used, this is the correct primer.

Lately many users of finishing materials—and large ones, by the way—have been specifying P-27B-2 as a first coat on steel parts, copper-plated steel and chemically-treated steel surfaces. Such recommendations are in error. The primer has many desirable characteristics, which probably are the reasons for its selection over primers formulated for sheet-steel application. These are the unique air-drying characteristics of the resin and its ability to take successive lacquer coats without danger of lifting.

Zinc chromate pigment is an excellent rust-inhibitor. However, on steel the resins used in P-27B-2 do not add any adhesion to the final finish film that cannot be obtained with good lacquers or synthetics. Both the Army and Navy Departments recognize the value of zinc chromate pigment as a rust-inhibiting agent, and for use on iron and steel surfaces they specify primers containing zinc chromate pigment. Navy specifications call for formula No. 84, which is a long-oil type. The Army specifies ES 680, Class 101, Metal Primer Brown. The latter primer is close in formulation to the type primer used so successfully in the automotive industry.

Too frequently the finishing industry is guilty of misusing a good material. Every product has its limitations. So, Mr. Production Executive, remember that even a Flying Fortress can't be used as a dive bomber. This analogy also applies to paint.—RUN AROUND.

Aircraft Plywood Finishes

★ Durable finishes for aircraft plywood have run the gamut of finishing operations and are now promising to boil down into a balance of durability against the lowest possible weight. The current trend is away from fillers and surfacers and toward less effort to produce a particularly smooth surface, with the attendant sanding requirements. Months of experimentation on these finishes have been fruitful.

The species of wood underlying the finish has a material bearing on the final durability factor. Clear sealers are definitely "in" and emphasis is placed on water-permeability resistance. Water permeability, as evinced by an increase in weight of the underlying me-

dium, is not to be confused with water resistance of the finish as pertaining to breakdown. Oil length, viscosity, penetration, solids and method of application will affect both. Some authorties to the contrary, overall durability can be increased by the use of a surfacer if it be off a type designed primarily for durability features rather than as an easy sanding medium.—W. T. SMITH.

Furniture Finishes

* Furniture finishes are getting down to the "bare essentials" rapidly, with latest restrictions of raw materials. Linseed-oil varnishes and substitute shellacs just about comprise the list for non-essential or non-critical purposes. Given sufficient oil length for flexibility, linseed-oil varnishes are likely to lack film strength, but with modification they may produce a satisfactory finish. Drying, depth, brilliance and rubbing properties are good. Some loss of scratch resistance and check resistance must be expected. The substitute shellacs are advancing rapidly. With the exception of alcohol resistance, which is of a low order for obvious reasons, they will be found surprisingly efficacious sealers, or for a complete finish. They may be flatted, and will rub very well.—W. T. SMITH.

Who Should Make Tests of Industrial Finishes?

* A defense plant engineer approached us recently with a United States Government finish specification. The specification listed several complicated tests that the finish must withstand. Since this plant has no laboratory equipment, the engineer was puzzled as to how he was to make these tests.

Each paint formulator must make such tests before he knows whether his formula is correct. He has equipment and trained personnel to do this work.

Before the formula is approved by the government, the tests are repeated at the proper government testing laboratory. The user then needs only certifications that the finish has been approved by the government. It is not intended that he, too, make these tests.

Several instances have come to our attention of concerns who are purchasing as much as a year's supply of paint without first making any tests. This seems to be a dangerous policy for both the user and supplier of the finish.

Several paint manufacturers will usually have made formulas to meet each government specification. All of them will have been tested by the government before they are approved for use.

Since two men seldom think exactly alike, different formulators will use different materials and methods in arriving at their formulas. While all of these formulas may meet the specification and be government approved, they may have individual characteristics.

Because of this, each user is well advised to test more than one formula for his job. Just because a finish is government approved, it does not mean that it is the most satisfactory one for the individual conditions of the user.

If a finish does not work well after it is in production, it is bound to cause delays. This may be costly for both the user and supplier. It seems, then, that it is good business for the user to make some preliminary tests. *These will*

not be the complicated laboratory tests mentioned in paragraph one.

The most satisfactory and practical test is to use enough of each finish in question to determine whether it meets conditions in the user's plant. It is not difficult to test drying time, adhesion, covering capacity and like physical qualities.—R. J. FAIRBURN.

Letters from I. F. Readers

(Continued from page 8)

is involved and what deliveries will be required. We shall be glad to see whether this is anything that we can handle and advise you accordingly.—The Upson Co., Lockport, N. Y.

In answer to a published letter in your November issue, page 7, wherein A. G. Co. wants .050 pyroxylin-coated fiber-board, we can supply .050 board, but would like to know how large a quantity this company is in the market for. We are sending you a few samples of same and we hope to hear from you.—Danvers Coating Co., Danvers, Mass.

Industrial Finishing Articles for Teaching

Will you kindly advise me at your earliest convenience if I may mimeograph or type out various articles in INDUSTRIAL FINISHING that might be of interest to my trade school students? Full credit for the articles will be given your magazine and the writer, in any way that you may wish it presented.

I believe I stated in my last letter that I had re-established my credits to teach painting and aircraft mechanics from high school to college students.—G. L. Hardy, Bell, Calif.

Request granted.—ED.

Fireproofing Canvas

We have a number of canvas covers which we use on van-type trailers. We wish to render these fireproof or at least flame-resistant.

Do you have in your files any information as to materials or paints which we can purchase and apply for this purpose? About the only requirements are that the final color should be olive drab, and that the material should be able to stand exposure to rain without serious bleaching. Stiffening of the canvas will not bother us.—J. S. M. Co. (Ordnance Plant).

We have submitted some information on this but probably some reader can supply information that is more up-todate. We will welcome suggestions and comments.—ED.

Composition Ornaments

In the November 1942 issue of INDUSTRIAL FINISHING, page 8, a request is made for information on composition ornaments. I have had considerable experience on this line, and if this information is still desired I would be very glad to pass this information on to the individual desiring it.—E. P. S. (Finishing Foreman).

Tumble Finishing

We would appreciate receiving a copy of the article on "Tumble Finishing" which appeared in the September and October 1941 issues of INDUSTRIAL FINISHING. We would also like to have any other information on this subject which you could furnish us. With this information, would you also send us a list of the people who manufacture tumbling equipment at the present time?—S. S. Co.

Can you furnish us with the names of makers of tumbling machines, or some other type of machine that will prove efficient in the coating of bolts and nuts?—B. F. Co.

Will you kindly send us reprints of R. J. Fairburn's article on tumble finishing, which appeared in the September and October 1941 issues of INDUSTRIAL FINISHING Magazine? Also, a list of the names and addresses of manufacturers of tumbling barrels.—B & J Co.

Requests granted.—ED.

Specification protective coatings are doing their part to help keep war production schedules rolling. There is a specially formulated United product to meet the rigid requirements of any Government specification protective coating. Years of constant research and product development have enabled us to meet the unusual requirements and demands of war work.—United Lacquer Mfg. Corp.

Ethylcellulose, cellulose acetate and various vinyl resins, are some of the other plastics which probably are more commonly regarded as such when formed into products by mechanical means, although, they, too, may be dissolved and deposited in thin films and remain plastics none the less. It might be pertinent here to refer to the classic remark: "It is still baloney, no matter how thin you slice it," which is another way of saying that most of the modern organic finishes are, in fact, plastics. Their chemical composition and physical characteristics are unaffected by their volumetric dimensions or by the addition and later subtraction of organic solvents.—Forbes Varnish Co.

NALCO

Infra-Red Ray Lamps

Best for Infra-Red Ray Baking and Drying

Carbon Filament Lamps, service proven, available in Inside-Silvered (self-reflecting) or in Clear Glass types. Write for details.

North American Elec. Lamp Co.
1030 Tyler Street St. Louis, Missouri

—SPRAY PAINTING—

Industrial and Commercial

Contains more than 125 pages. Fully illustrated. Cloth. Price.....$1.50

This new book covers the fundamental principles of spraying technique, together with the latest developments and practices of this craft. Covers common paint pigments, paint extenders, enamels, oil and spirit varnishes, shellac lacquer, synthetics, all types of modern air guns, spraying technique, spraying standard materials, spraying defects, their cause and remedy, flock and suede finishes, striping and lettering, pearl lacquer finish, also a section on spraying for National Defense which covers cantonments, finishing fabric-covered aircraft, plywood aircraft, camouflage painting.

INDUSTRIAL FINISHING
1142 N. Meridian St. Indianapolis, Ind.

Color in War Factories

THOUGH interest in color during war times seems to center around the art of camouflage, one is not to forget its application to the home front of industry. According to the Color Research Laboratory of the Eagle Printing Ink Co., Division of General Printing Ink Corp., New York, color in factories and offices is accomplishing much to speed up work and to help thwart a rather tragic increase in accidents brought about by the demand for speed and by the influx of new and relatively inexperienced labor.

To get the most utility out of color, here are some of the functions being applied. Red as a danger signal is giving way to a more prevalent use of yellow, yellow-green and orange—all of which have much higher visibility and noticeability.

Machines are being painted in lighter tones, both to reduce shadows and reflect more light, and to build up better contrast with materials handled.

Brighter colors on floors increase illumination efficiency and throw light on the underside of equipment.

Colorful walls offer relief from monotony and a chance to relax eyes which are tired by critical seeing tasks.

Whole plants are being studied, having in view traffic, materials and operations. This is color "engineering" in the true sense of the word. Eagle will send special reprints on the subject to those interested.—H. K.

What Japan Is

THE WORD "japan" is one of the most unpopular words among English speaking people and their allies today. It still has some use in the paint industry, however.

The original japan was a hard, lustrous, black finish made by the Japanese. The resin used was derived from a species of sumac. Our first japan finishes were so called because of their resemblance to the Japanese finish. At one time, any quick-drying finish was called a japan.

Later, this term was applied chiefly to air-drying and baking finishes made of asphaltum and gilsonite. The latter is a substance that resembles coal in appearance. It is found in Utah and, in limited quantity, elsewhere.

When these finishes are baked—usually at high temperatures—they become very hard and have a high luster. They are also made in a dull or "rubber" luster. Job finishers are still known as Japanners.

Japan colors are pigments dispersed in hard-drying varnish. They were formerly used by the carriage trade. They may be thinned, usually with turpentine, and used as an enamel finish. They may also be used as tinting colors. Because of their quick-drying properties they still find favor with sign painters.

Japan dryer is a hard resin in combination with paint dryer, in a liquid form. It is usually added to paints, varnishes or enamels to

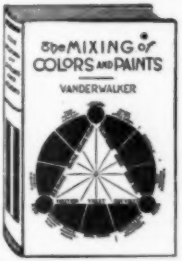
SAVINGS up to 25%
of your Finishing Cost!
with a G. M. No. 5
PRESSURE SPRAY GUN

Patented Nozzle Reduces 25% Mist and Saves Paint

Better atomization, greater speed, G. M. Gun lays material more uniformly on object. Excess mist eliminated; paint saved. Patented nozzle with combination of external and internal atomization gives double breakage; finer atomization. From 1/8-in. to full wet 14-in. fan spray. Very moderate price. For details write Dept. L.

G. M. MANUFACTURING CO.
Engineers, Mfrs. of Complete Spray Equipment
216 N. Clinton St. Chicago, Ill.

GET THIS BOOK



COLOR formulas and Useful Color Cards. Description, Properties, Theory, Harmony and Management of Colors. Furniture and Polychrome Finishing. Color and Light; Description of Color Pigments; Properties of Color Pigments; How Colors Are Prepared for the Trade; Basic Paint Pigments; Painting Oils; Volatile Thinners and Dryers; General Paint Mixing Methods; Color Theory, Principles and Use; Colored Paint Mixing Methods; Mixing Special Purpose Materials; Color Harmony and Management; Selecting Color Schemes.

296 Pages, Fully Illustrated with Color Chart and Drawings, Cloth. Price..... **$2.00**

INDUSTRIAL FINISHING
1142 N. Meridian St. Indianapolis, Ind.

RANDOLPH

Dopes
Specification Finishes
Lacquers—Enamels
and Thinners

Are meeting today's demands under the stress of war conditions.

The Randolph organization is geared to give you peace-time service.

RANDOLPH
FINISHING PRODUCTS CO.
Carlstadt New Jersey

WOOD FINISHING

A Book of Formulas and Detailed Instruction Method, Tools and Materials, Period Finishes, Staining, Filling, Varnish, Painting, Enameling, Glazing, Lacquers.

WOOD Finishing in General; Preparation of New and Old Surfaces; Stains in General; Factory Prepared Stains; Water Stains; Aniline; Chemical Water Stains; Color Pigments; Dyewood; Spirit Stains; Oil Stains; Stain Mixing; Brushing and Procedure; Wood Fillers; Varnish and Shellac; Varnishing, Rubbing, Polishing; Varnish Defects; Lacquers; Wax and Oil Rubbed Finishes; Trim; Working Operations; Woods; Brush Graining; Decorative Wood Finishes; Repairing Damaged Finishes.

360 Pages, Cloth. Price.....$2.00

INDUSTRIAL FINISHING
1143 N. Meridian St. Indianapolis, Ind.

accelerate drying. The exact mechanics by which these dryers accomplish their purpose is not definitely known. It is believed that they act as a catlyst to introduce oxygen into the oils of the finishing material.

With some imagination one might take some satisfaction in the fact that the word "japan" is gradually falling into disuse by the paint industry. There are now so many quick-drying finishes that they must now be distinguished by their proper names: such as "4-hour enamel," or "lacquer," etc.

Black finishes are "black asphaltum," "synthetic black," "black gilsonite," etc. Dryers are "liquid dryer," or "metallic dryer" and further designated as cobalt, lead, manganese, etc.—R. J. FAIRBURN.

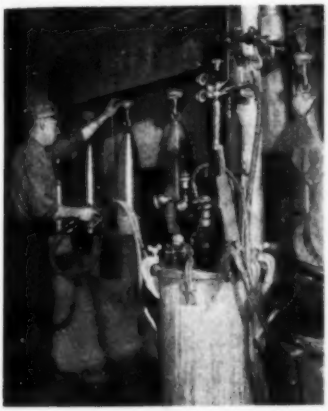
Care of Spray Guns

THE use of spray guns that are out of order—for example, out of adjustment or badly worn—is the direct cause of a lot of lost time and poor finishing. When new parts and equipment are scarce, as they are in these war times, special care should be given to all spray equipment in order to make it last and do the job as long as possible. With the proper care, spray guns can be made to last for several years. I have observed this from experience.

We have a spray gun parts-kit, made of sheet metal and separated into small compartments, in which we keep a small supply of new spray gun parts. If a part is broken or worn too badly for use, we can immediately replace it with a new part. We also keep one extra spray gun on hand. By changing air caps we can use any ordinary

material such as lacquer, synthetics, etc. In doing this, we can keep our spray booths operating at full speed practically all of the time, with only a few minutes out occasionally for changing parts or a gun.

Some of the old parts can be used again if they are put in condition — such as grinding a fluid needle into a fluid tip with the use of a valve-grinding compound. Parts that are broken or too badly worn for further use, are put in the salvage scrap.



Spray-painting outside of 155-mm. shells. Photo, courtesy Office of War Information.

On the operator's side of each spray booth I have a chart which is printed in three columns. The left hand column is headed "Trouble"; the middle column is marked "Possible Cause"; and the right hand column is marked "Remedies". Under the heading of "Trouble" is listed practically everything that can happen to a spray gun. In the other columns are listed the causes and remedies. This on-the-

High Safety — Low Service Cost

The R-151 Respirator has an outer dust filter which protects chemical cartridge against clogging. Simply replace inexpensive dust filter — get longer service from cartridges, keep down breathing resistance. Write for details and prices.

PULMOSAN SAFETY EQUIP. CORPORATION
Dept. IF, 176 Johnson St., Brooklyn, New York

CROWN

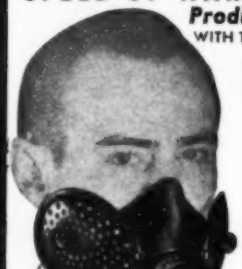
This NEW Crown gun gives high efficiency and speed in production work and maintenance and other painting and finishing jobs . . Uses time-tested Crown "20" Spray Head assemblies . . Full Spray Width, Material Adjustment . . Write for literature and prices.

Built to Stand the Gaff

SPRAY GUN

CROWN SPRAY GUN MFG. CO.
1218 Venice Blvd. Los Angeles, Calif.
Warehouses in Principal Cities

SPEED UP WARTIME Production!
WITH THIS NEW
Cesco No. 94 RESPIRATOR



★ Full U. S. Bureau of Mines Approved (No. BM-2142) against Type A (Silica), Lead and Nuisance Dusts. Equip your workers with this new COMFORTABLE and SAFE Respirator for FASTER DEFENSE PRODUCTION. It's the "Cesco No. 94." Write.

Chicago Eye Shield Co.
2367 Warren Blvd. Chicago, Ill.

Practical Furniture Finishing

The Most Complete Handbook On Finishing Fine Woods Ever Written

Tells EVERYTHING you need to know about Wood Finishing. Includes types of unfinished furniture, choice of finishes, brushes accessories, precautions, natural finishes, staining, filling and bleaching, varnish, enamel or paint finishes, finishing with a spray gun and many other fascinating practical subjects. Also includes complete section on furniture repairing and refinishing. Four pages of 32 different foreign and domestic woods illustrated in natural colors. 112 pages fully illustrated.

CLOTH, POSTPAID.....$1.25

INDUSTRIAL FINISHING
1142 N. Meridian St. Indianapolis, Ind.

spot information is a great help to spray operators. They can look over the chart when their spray gun is not operating properly and immediately find the cause and also the remedy. This all makes for a great saving of valuable time.

We have our spray guns dismantled only when they are dirty or out of order. Each gun is a firm piece of precision equipment and should be dismantled only when absolutely necessary. Much valuable time has been lost through the unnecessary dismantling of spray guns by inexperienced people. They should be dismantled only by someone who knows spray guns thoroughly.

By using the proper fluid tip and fluid needle, practically all types of lacquer and synthetics, opalescents, etc., can be sprayed. The operator simply changes to the proper air cap for the type of material being sprayed. A time saving is effected here because it is not necessary to dismantle the spray gun.

We brush our air caps with proper solvent and oil. All working parts are cleaned every day and we are able to get excellent service and smooth finishes by taking proper care of our spray guns in this manner.—F. HAGAN.

New Pacific Office Opened by Detroit Rex

The Detroit Rex Products Co., metal-cleaning engineers, has moved its Los Angeles office to new and larger quarters at 1506 Santa Fe Ave. Occupying more space, the new offices now enable the company to offer the best cleaning service possible to industries in the Southern California territory.

Mr. S. B. Crooks, transferred from the Mid-Western region with offices in Chicago, became manager of the Pacific region January 1, 1943. His new headquarter are in the Los Angeles office.

Mr. W. A. Vensel, formerly Pacific region manager, supervises sales and service in the Southern States.

Cleaning Iron and Steel Surfaces

DURABILITY of paint coatings on iron and steel depends as much on correct cleaning and preparation as on finishing materials. Often the failure of paints is blamed on the paint manufacturer, when in reality the cause for failure was there before the paint was applied.

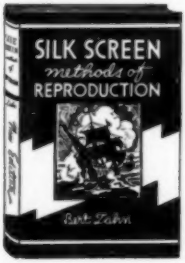
Most finishers recognize the necessity of removing grease, oil and drawing compounds prior to painting, but sometimes they may use cleaning methods that do not completely remove these "enemies of paint adhesion."

Likewise, most finishers know that all traces of rust must be removed from iron and steel before painting but, they may not recognize the fact that steel and other metal parts, which do not appear rusty, are normally coated with oxide films which will cause trouble if not removed before the paint is applied.

The common but little understood cause of the failure of finishes is the reactivity of most metal surfaces with moisture, atmospheric gases, salt air, etc. These "Enemies of paint adhesion" pass through most organic finishes in minute amounts and set up corrosion on the reactive metal—and the paint adhesion is destroyed.

This cause of paint failure is more prevalent on zinc and cadmium, and somewhat less prevalent on aluminum and brass, and still less on steel. To prevent this action, the metal must be passivated or made non-reactive. The treatment required depends on the kind of metal. For steel and iron—re-

SILK SCREEN METHODS of REPRODUCTIONS



Fully Illustrated by the Author. Leatherette Binding. Size 5x7½ in. 193 Pages. 98 Illus......$3.00

THIS new book is intended for Sign Painters, Card Writers, Display Men, Furniture Manufacturers, Novelty Manufacturers, Glass Etchers and for Domestic Use.

Every detail of the silk screen process is presented clearly in detail. All equipment is fully described and its use illustrated. All materials needed in the various kinds of silk screen work are mentioned with respect to their use to advantage. Estimates of costs and prices to charge are given.

INDUSTRIAL FINISHING

1142 North Meridian Street Indianapolis, Ind.

WARTIME STRIPING

5 MODELS 14 SIZES OF STRIPES
SINGLE, DOUBLE OR TRIPLE

BEUGLER MFG. CO.
4316 W. 2nd St. Los Angeles, Calif.

IDENTIFICATION of Alloys, Parts and Products, of bar stock, tubing, cables and castings. VALUABLE in stock room, factory and assembly plant. APPLIES enamel, paint, lacquer, bronze, and glue to Metal, Wood, Plastic, Rubber, Paper, Glass or Fabrics.

Blanchit
Reg. U. S. Pat. Off.
WOOD BLEACH
Improved to Intensify Action.
Saves Time and Labor.
L. R. van ALLEN COMPANY
(Pat. Licensee)
406 N. Wells St. Chicago

move all grease, oil or drawing compounds and loose scale, surface oxides, rust, etc. Even when the surface of metal does not appear rusty it always has an oxide coating. Cleaning methods can be used that are combined into one operation for the removal of oxide, oils and dirt.

For best resistance to severe exposure, the surface should be passivated. This treatment must be preceded by a degreasing agent. Although there are many others, here is one of the methods that I have found satisfactory:

1) Dip or spray with hot alkali cleaning solution. (A commercial cleaner is generally preferable, but an alkali cleaner can be prepared by mixing equal parts of sodium phosphate and sodium silicate. Use from 2 to 4-oz. per gallon of water at 180° F.)

2) Hot water rinse.

3) Neutralizing rinse.

When no additional treatment is intended after alkali washing, a neutralizing rinse is imperative. This rinse may be either of the following:

1) One to two fluidounces of phosphoric acid to 100 gallons of water. (Dilute phosphoric acid solution.)

2) 7.5-oz. (by weight) chromic acid to 100 gallons of water. (Dilute chromic acid.)

A hot water rinse should follow both operations.

Vapor degreasing machines, which use chlorinated solvents of high cutting action, are being used with satisfactory results, but the cost of installation is rather high. Smaller shops generally use manual washing with solvents such as naphtha, lacquer thinner or a mixed cleaner, scrubbing the surfaces with rags, brush, sponge or mop, and wiping with clean rags.

The removal of oxides is accomplished by acid treatment. There are several solutions on the market that are satisfactory, but I have had good results with a hot water solution of alkaline platers' cleaner,

with an operation pH of 12 to 13.5 at 180° F. to 200° F.

The use of dilute phosphoric and chromic acids has proved adequate in most cases, as this treatment will produce a tightly adherent layer or film of iron phosphate which gives an excellent base for most organic finishes.—J. S. DUNKIN.

New Masking Material

A NEW masking material being used in aircraft production is a varnish-like liquid which is sprayed on Plexiglass panels before they are installed in the enclosure assembly. Plexiglass, as most people know, is a clear plastic which serves as glass. It may be heated and formed into any shape desired. The usual practice has been to protect these Plexiglass parts with masking tape and paper before spray painting.

This new material is sprayed on the plastic panels before assembly. After the job is completed and the framework has been spray painted, the temporary coating is peeled off of the Plexiglass just like a sheet of cellophane.

This temporary coating also protects the surface of the Plexiglass during assembly, whereas formerly it was often scratched and marred. In such cases the disfigurement had to be polished out, using the same process as on a lacquer film. —AL.

LACQUERS—PRIMERS—SYNTHETICS

Nationally-known manufacturer will sell overstock of high-grade Lacquers, Primers and Synthetics. All types and colors at greatly reduced prices. Write, giving us your detailed requirements and colors. STEELCOTE MANUFACTURING CO., 3418 Gratiot St., St. Louis, Mo.

Classified Advertising

Rate: 45 cents per line per insertion—minimum $1.35

ORGANIC COATINGS ENGINEER.

Experience in the selection, use and evaluation of paints and lacquers. And in the cleaning and preparation of surfaces to receive them. Development, supervisory, and field record. Native American; 51. Available on reasonable notice for connection with well-rated firm. Address IF-912, care Industrial Finishing.

COST ACCOUNTANT

For Paint and Varnish Manufacturer. Write, giving age, draft status, experience, education and salary desired. Address IF-910, care Industrial Finishing.

SALESMEN WANTED

For South, Mid-West, and West. Excellent opportunity for live wire, with nationally established firm. Manufacturer of finishing supplies and finishing hardware distributor. Only men of highest integrity and familiar with finishing trade will be considered. Liberal weekly advance against commissions. Write, stating qualifications and references, to FINISHINE LABORATORIES, INC., 627 Tallman Street, Syracuse, New York.

INDUSTRIAL PAINT SALESMAN.

Berry Brothers needs more manpower for the present and for the future. Leadership in the Aviation Finishing Field makes it necessary to contact the widespread sub-contractor field of this industry.

Experienced men are wanted—those who have been situated in their present territories for a number of years. It makes no difference if your experience has been with a small or a large company. We are primarily interested in securing the right men. In addition to aviation finishes we are interested in the general industrial war production field and have products to cover.

Write to BERRY BROTHERS, 211 Leib Street, Detroit, Michigan, for an application form.

WE BUY DIRTY SOLVENTS

Don't throw away spent cleaning thinner, degreaser residues, etc. Send us a sample for quotations. We also reclaim for customers. DYTEX CHEMICAL CO., 267 Plain, Providence, R. I.

Index to Advertisers

Advance Paint Co. ..... Third Cover
Aluminum Industries, Inc. 53
Arco Company, The 75

Berry Brothers 83
Beugler Mfg. Co. 118
Binks Mfg. Co. 70-71

Chicago Eye Shield Co. 116
Claremont Waste Mfg. Co. 101
Classified Advertising 119
Commercial Solvents Corp. 91
Crown Spray Gun Mfg. Co. 115

Day & Co., James B. 81
Despatch Oven Co. 100
DeVilbiss Co., The 34-35
Dolan & Co., V. J. 5
duPont deNemours & Co., E. I. 60-61

Egyptian Lacquer Mfg. Co. 72

General Industrial Finishes 59
G. M. Manufacturing Co. 113

Hilo Varnish Corp. 47

Industrial Chemical Development Corp. 105

Johnson & Son, Inc., S. C. 33

Koch Sons, Inc., George 5

Lawrence-McFadden Co. 95
Lilly Varnish Co. ..... Front Cover
Lowe Brothers Co. 85

Maas & Waldstein Co. 93
Mahon Co., The R. C. 36
Mearl Corp., The 97
Murphy Varnish Co. 1

New York Woodfinishers Supply Co. 102
North American Elec. Lamp Co. 112

O'Brien Varnish Co. 87

Perfection Paint & Color Co. 41
Pulmosan Safety Equipment Corp. 115

Randolph Finishing Products Co. 114
Reliance Varnish Co. 69
Rockford Varnish Co. 77
Ronan Co., Inc., T. J. 103
Ronci Machine Co. 6
Roxalin Flexible Finishes, Inc. ..... Second Cover
Rudd Lacquer Corp. 81

Schaefer Varnish Co. 79
Southern Varnish Corp. ..... Back Cover
Standard Varnish Works 89
Stanley Chemical Co. 45
Stille-Young Corp., The 9

United Lacquer Mfg. Co. 6

vanAllen Company, L. R. 118
Varnish Products Co. 99

Walker Co., H. V. 67
Watson-Standard Co. 85
Wipe-On Corp. 43

Zapon Division—Atlas Powder Co. 2

BOOKS *on finishing available*

"CHEMICAL FORMULARY" (Vol. V)	$6.00
"WOOD FINISHING" (360 Pages, Cloth)	2.00
"THE MIXING OF COLORS AND PAINTS"	2.00
"FINISHING METAL PRODUCTS"	3.50
"LACQUER AND SYNTHETIC ENAMEL FINISHES"	5.50
"SPRAY PAINTING—Industrial and Commercial"	1.50
"SILK SCREEN METHODS OF REPRODUCTIONS"	3.00
"PRACTICAL FURNITURE FINISHING"	1.25
"FURNITURE FINISHING" (543 Pages)	4.00
NATIONAL PAINT DIRECTORY	7.50
SUBSTITUTES (Latest Book)	4.00

Cash Must Accompany Orders

INDUSTRIAL FINISHING, 1142 N. Meridian St., Indianapolis, Indiana

Victory FIRST

A War Message from the makers of O'Shelac

EVERY TRUE AMERICAN — whether his job lies on the battle front, the production front or the home front — must awaken to the crisis that faces this nation today. He must not allow himself to be blinded by selfish ambition, personal comfort or by false illusions of security. He must open his eyes to the mortal peril in which his nation stands, and act accordingly. Only in this way will we keep democracy's light shining from these shores.

ADVANCE PAINT COMPANY

Manufacturers of Wood & Metal Finishing Materials

INDIANAPOLIS, INDIANA

SURFACE RAIDERS

Industrial products, as well as ships, face the peril of *surface raiders*. But it's much easier to protect the products of industry . . . for Southern Varnish Corporation finishes, do the job thoroughly, economically. Produced with scientific precision to amply fulfil specialized industrial needs, Southern Varnish Corporation finishes are unsurpassed in uniformity, durability, and aesthetic appeal.

SYNTHETONE
LACQUERS
VARNISHES
SYNTHETIC FILLERS
SOVATONE STAINS (NGR)
PAINTS - ENAMELS
WIPE-RITE STAINS
SPRAY-RITE STAINS
SPECIFICATION FINISHES

SOUTHERN

VARNISH CORPORATION

Roanoke, Virginia

...have a finishing ...our technical ...

BUY BONDS